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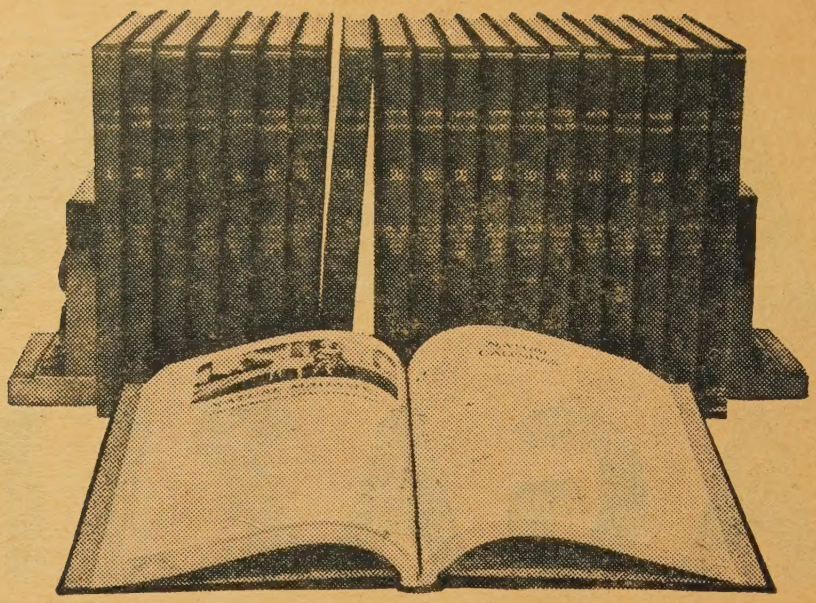

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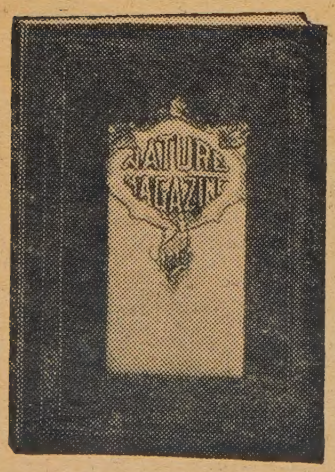

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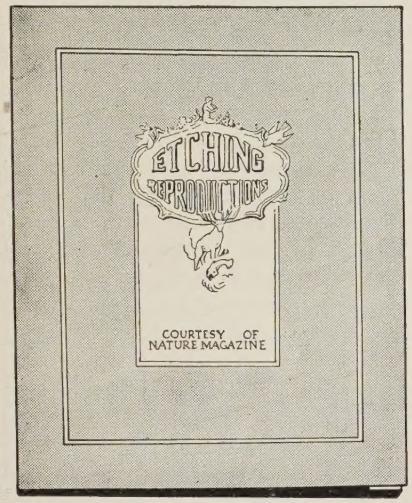

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A New "Walden"

Walden. By Henry David Thoreau. With an introduction, interpretative comments and 142 photographs by Edwin Way Teale. New York. 1946. Dodd, Mead and Company. 386 pages. $5.00.

"In adding another to the long list of *Waldens,*" says Edwin Way Teale in his foreword, "I have tried to produce the book I have often looked for for my own library: a volume that would give Thoreau's complete text together with background information about *Walden* and the man who wrote it and combined with this an ample store of photographic illustrations which would enable me to see for myself—through the eye of the camera—the places where Thoreau lived, where he walked and thought, some of the things his hands had created, some of the natural objects he collected, something of the beauty and wildness and variety which still remains in scenes he loved so passionately."

It would be superfluous, in reporting upon this latest of more than a half-hundred editions of *Walden,* to review Thoreau's original great work. Rather, we must weigh this volume in the light of Mr. Teale's objective quoted above. Has he succeeded in providing what he set out to provide? He has, and with the happiest collaboration on the part of his publishers.

Edwin Way Teale, who is himself carving a distinguished niche in the cathedral of Nature writing, regards *Walden* as the greatest book ever written by an American. So, to his interpretative introduction, and to his photographs, he brings a deep appreciation of Thoreau, his convictions and his contributions. This introduction is a splendid piece of writing; a concise and valuable introduction to *Walden* and its author.

"In a way," says Mr. Teale, "Thoreau at Walden takes on something of the character of one of those warriors of old sent out by an army to fight its decisive battle. He seems the delegate of all, the representative of cramped and thwarted and desperate humanity fighting for freedom of the highest kind. His life there —the good life, the sane life, the golden mean, plain living and high thinking— this is the nebulous, unattained goal which Everyman glimpses in his best moments. In Thoreau's experiment, Everyman finds vicarious fulfillment of the dream. Thoreau is the friend of our highest hours. Thus Emerson's oft-quoted words have special meaning: 'Wherever there is knowledge, wherever there is virtue, wherever there is beauty, Thoreau will find a home.'"

Pointing out that John Burroughs once said that Thoreau had a "trick" of belittling things accepted by the world as important, and exaggerating the unimportant, Mr. Teale asks: "But what if it wasn't a trick? What if Thoreau was right? What if the world's values are topsy-turvy? He was neither joking nor exaggerating when he said that in his soul he believed the greater part of what his neighbors called good was bad. He marched to the sound of a different drum. And, as the years have passed, others have heard echoes of the sound."

We are indebted to Edwin Way Teale for adding to the clear and unmistakable reverberation of those echoes. R. W. W.

Ducks

Prairie Wings. By Edgar M. Queeny, with explanatory sketches by Richard E. Bishop. New York. 1946. Ducks Unlimited. 256 pages. Frontispiece in color. Illustrations by the author. $15.00.

This is a beautiful book that will delight anyone interested in birds, particularly ducks. It is essentially a book of pictures, although Mr. Queeny's text is an example of fine and sincere writing and is packed with information on the habits, particularly the flight habits, of the so-called river ducks. "Good photographs, of wildlife," the author says, "are the result of extraordinary good luck or a certain amount of skill, coupled with infinite patience and a good knowledge of the quarry. For this reason wildlife photography will always remain the sole province of the enthusiast. The time element alone will exclude the professional; costs would be prohibitive." The number and beauty of Mr. Queeny's pictures stand as proof of this assertion. They represent unnumbered hours and days spent on the Grand Prairie of Arkansas, for the most part between eight and ten in the morning, to get a wide variety of camera shots of birds coming, resting and going. One remarkable series shows the duck taking off, others portray variation in flight to meet certain circumstances. The discussion of flight characteristics, illustrated by photographs and Mr. Bishop's fine sketches, is particularly fascinating. Save for one chapter on gunning, the book considers the ducks objectively and not as targets. R.W.W.

A Cat in the House

How to Live with a Cat. By Margaret Cooper Gay. New York. 1946. Simon and Schuster. 267 pages. Illustrated by Roberta MacDonald. $2.75.

Margaret Gay has lived with cats most of her life, and has owned a pet shop for six years, but she has written, in this book, something quite different from existing cat manuals. The difference lies in the fact that the author writes with wit combined with practical advice, and the humor of the book is heightened by Roberta MacDonald's cat cartooning. In other words, this is both an entertaining and a practical book, one that would be welcomed by any cat lover.

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Nature in Print

By HOWARD ZAHNISER

As ONE wanders through a museum—perhaps with children as amiable excuses for much looking and little study—one seldom reflects on the experiences that have surrounded the collection of the exhibits, which are (usually) so easily seen. Such desultory gazing will not be so innocent an indulgence for anyone who has read the late Thomas Barbour's *A Naturalist's Scrapbook*, or Theodora C. Stanwell-Fletcher's *Driftwood Valley*.

Dr. Barbour's engagingly gossipy collection of assorted essays, describing, as he says, "all sorts of notions and events," and Dr. Stanwell-Fletcher's intensely dramatic and, to the reader, almost plot-suggestive selection of journal entries are as much unlike as two works of prose could be. Yet both testify to the human adventure that is behind the museum exhibits that many of us have so readily available.

If one is to take the words of the obviously whimsical "T.B." at their literal value, his long professional devotion to museum work was basically the fortunate indulgence of "a pack rat, a frank and unashamed pack rat." For Mrs. Stanwell-Fletcher and her gallant husband in the deep midst of a great wilderness, work for a museum, although diligently done, was actually a dignifying purpose for their glorious adventure—giving them "a certain standing" accompanied by access to "much helpful equipment, permits, and valuable information."

Nevertheless, Harvard's Museum of Comparative Zoology, and other institutions, too, are the richer for Barbour's indulgence, and one can suspect that the British Columbia Provincial Museum at Victoria will long value the trophies brought from one of the Province's still primitive treasuries by two noble adventurers who had both "acquired a taste for the loneliness and realism of out-of-the-way places and peoples." Satisfying this taste was the easier because both "had always possessed an unquenchable love for, and curiosity about, wild animals," and—most finally—because both were in love and mutually desirous of living in and studying the wilderness.

One can certainly prize highly these two books for the awareness they thus convey of the often overlooked excellence of our museums. The awareness they convey of the possible richness of human living is even more to be valued. Readers of Thomas Barbour's earlier and more extensive *Naturalist at Large* will know what to expect in this regard from *A Naturalist's Scrapbook*—essentially a companion to the earlier autobiographical work—but *Driftwood Valley* offers all readers an experience with a newness that matches its satisfactions.

In the first place, Mrs. Stanwell-Fletcher writes with such a kindliness of love for her husband, with such a disarming frankness untouched with sentimentalism, that a reader comes quickly to enjoy without uneasiness their intense companionship. "He always looks rather nice when it rains, because his black hair—what there is of it—curls all over his head," she writes early in the volume, and again she describes with nice affection "those strong hands of his—so hard and muscular, and yet with the finely shaped fingers which no amount of rough work can spoil and which proclaim the artist and romanticist." "He is," she confesses, "so far, the bravest person I know—never yet have I seen him shrink from hardship." Sometimes she admires him with humor: "J. was up, dressed and starting the fire before I was ready. J. is one of those annoying mortals who are ready for action the minute they open an eye. Training and character, he says." Then, again, Mrs. Stanwell-Fletcher describes her penetrating observations of her husband, as for example in the following paragraph which has general significance also:

"It's interesting to me to watch the transformation in J.'s viewpoint about trapping and hunting. Although he has trapped in the Arctic and been more than a successful hunter of big game, he now quite definitely dislikes trapping the larger mammals, or killing, except in cases of necessity. From boyhood he's been crazy about wild things, but since he's begun to study their lives and habits, he's acquired such a feeling for them as individuals that the desire to take life from them has become more and more distasteful."

It is a privilege thus to become acquainted with such a man as "J.," and at the same time to come to know so well Mrs. Stanwell-Fletcher. The richness of their companionship will for many readers provide the greatest enjoyment of *Driftwood Valley*.

The surroundings to which they took themselves—their remoteness from other men and women—intensifies this companionship for the reader as, of course, it did for themselves. They were indeed fortunate in finding what they sought. "What we wanted," they told the Indian Dominick West at the outset, "was a lake surrounded by good forest that has not yet been burned, where no one else lives, that is in big mountain country, and far enough away so that we shall not be disturbed by visitors." They found just that. Dominick West directed them to it rather promptly!

"After a long silence, in which he stood with bent head considering perhaps what he could tell us, or perhaps wondering whether he should tell us anything, he began abruptly, in a broken pidgin English, to talk about a lake with a soft musical name which sounded like 'Te-tan-a.' He likes this lake in the Driftwood Valley so much, he said, that he often travels far out of his way just to look at it. "It is so 'pletty.' The water is different from other lakes. One can see white stones on the bottom. The forest around it is not burned. There are mountains, 'beeg' mountains, all over, but one can see out. It is not like a 'plison.' There are moose, good fur, lots of fish. Nobody lives there. A few Indians trap in the region, have winter or summer camps there, but it is very 'lonely.'"

Here the Stanwell-Fletchers built their cabin and lived, studied the wild animals, experienced the cold and the mountains and the heavens, all of which Mrs. Stanwell-Fletcher vividly describes, went about their museum projects—and lived. There are many kinds of satisfaction for her reader. This reviewer finds that the passages he has—in his usual fashion—noted for possible quotation number an even four dozen. The best of those remaining, it seems, represent wolves and wilderness living, and these also seem to be the two subjects that *Driftwood Valley* best illuminates. Mrs. Stanwell-Fletcher describes the study of wildlife as "our real joy and chief occupation," and the wolves obviously became their specialty. One quotation must suffice, but it is hard to imagine how anyone who will read this "Nature in Print" page can ever be so unfortunate as to miss

Winter in the Alleghanies

By M. CLIFFORD HARRISON

The stealthy dusk creeps on, the twilight dims;
Oaks quiver through their naked, aching limbs;
The mountain line, etched bleak and cold and gray,
Like frozen bulwark stretches far away;
Grim, hoary, changeless silence far and near
Locks fast the earth in clutch deathlike and drear;
Tints fade from out the heavens, while, below,
Roofs, fields, and hills alike are white with snow.

any of *Driftwood Valley*.

"Utter silence, a deathlike hush over the land, and then, from somewhere below, came a sound that made our hearts stand still. Like a breath of wind, rising slowly, softly, clearly to a high, lonely note of sadness and longing; dying down on two distinct notes so low that our human ears could scarcely catch them. It rose and died, again and again. A wolf singing the beauty of the night, singing it as no human voice had ever done, calling on a mate to share the beauty of it with him, to come to him, to love him. Over and over it sang, so tenderly and exquisitely that it seemed as if the voice were calling to me and I could hardly keep from crying. The whole wilderness was musical with it. . . . I hardly remember getting into bed and to sleep, but all night in my dreams I thought I could hear a wolf calling and singing and sobbing in a voice of exquisite tenderness."

Finally, the temptation to gather together at least some of Mrs. Stanwell-Fletcher's characterizations of wilderness living is irresistible. "It is stimulating to realize that it is the keenness of my senses and intelligence and no one else's which will keep me safe." . . . "Here we have traveled thousands of miles to reach a wilderness undisturbed by man, only to have a plane crash almost on our doorstep." . . . "When one constantly watches the workings of a wilderness one comes to know that things are cared for with a surprising orderliness and steadfastness." . . . "There is infinite satisfaction in hard physical work well done, and in the completely relaxed, quiet nerves that follow." . . . "The gift of quiet is one which inhabitants of the civilized world don't possess." . . . "In the wilderness we have never once caught cold from being wet or chilled." . . . "Life in a wilderness seems always to be one of endless physical—and mental, for without the mental one would never have the guts to endure the physical—struggle and endurance." . . . "Above all other things, perhaps, the wilderness teaches patience and endurance."

But a reviewer should certainly not try to cultivate these particular virtues in his own readers—especially when writing of a book that requires neither.

Driftwood Valley. By Theodora C. Stanwell-Fletcher. Animal sketches by John F. Stanwell-Fletcher. An Atlantic Monthly Press Book. Boston: Little, Brown and Co. 1946. 384 pp., with map, 2 photographs, sketch of cabin, 10 text drawings of animal tracks, 18 animal sketches on 15 plates, and list of plants and animals found in the Driftwood region. $4.

A Naturalist's Scrapbook. By Thomas Barbour. Cambridge: Harvard University Press. 1946. 218 pp., with 26 photographs on 16 plates and index. $3.

New Bird Guide

Audubon Bird Guide. By Richard H. Pough. Garden City, New York. 1946. Doubleday & Company. 312 pages. Forty-eight color plates by Don Eckelberry. $3.00.

This latest addition to the list of guides to the birds is a distinguished one. Sponsored by the National Audubon Society and written by Dick Pough, research associate of the Society, the book is of great credit to both sponsor and author. The scope of the book in point of area covered includes eastern land birds found east of the eastern edge of the semi-arid Great Plains. A preliminary foreword outlines certain fundamentals essential to successful and enjoyable bird study. Don Eckelberry's excellent plates illustrate 275 species, and present 400 plumages. These plates are gathered conveniently in the center of the book.

New Astronomy

Sun, Moon and Stars. By William T. Skilling and Robert S. Richardson. New York. 1946. Whittlesey House. 274 pages. Illustrated. $2.50.

This is a new astronomy for beginners written by two California astronomers who have a faculty for telling the story of the universe in simple terms. The authors take a talking-with-you approach that eliminates any feeling on the part of the reader that he is undertaking an abstruse subject, possible of description only in highly scientific terms. There have been many astronomy books published, and in many cases the authors have started with the intent of making them truly useful to the layman. Too often they allow their texts to become difficult because of their own wide knowledge of the subject and the assumption of more knowledge on the part of the reader than actually exists. In this immediate volume the authors have admirably avoided these pitfalls. R.W.W.

Hawaiian Plants

Plants of Hawaii National Park. By Otto Degener, Poughquag, N. Y. 1945. Published by the Author. 314 pages. Illustrated. $2.50.

Formerly botanist at the University of Hawaii and naturalist at Hawaii National Park, Otto Degener is well equipped to write this book, which is at once a guide to the plants of the Park, and illustrative of the plants and customs of the South Seas. The book is not presented in the usual botanical guide form but with an interestingly written text into which is woven much lore and information about the Islands. It will be of interest to anyone who has been to Hawaii, lives there, or is going there.

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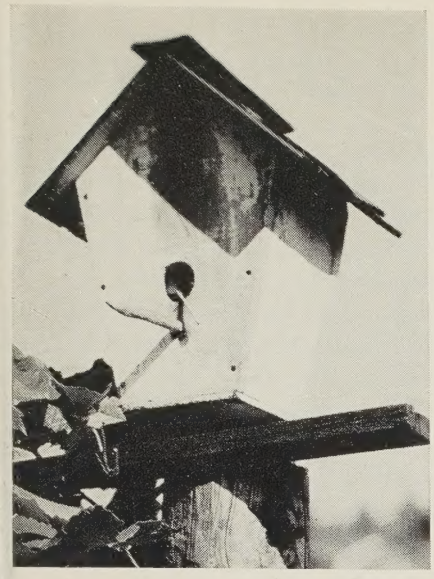


USEFUL WISHBONE

By Ellen Keener Teter

During the winter, sparrows had enlarged the entrance hole of the wren house on our washpost. When the wren returned to do her spring house-cleaning, and prepare the home for a family, the sparrows systematically hampered the little bird. Somewhere, however, the wren found a wishbone, carried it to her house and lodged it firmly in such a way that it reduced the opening into the house to wren size again. No doubt there will be those who will argue that this was just coincidence, and that the wren got the bone just so far and could not get it all the way into the nesting place. Nevertheless, we like to think that the wishbone was ingeniously used to foil the sparrows—indeed, we *do* think so.

Honor Illinois Artist

Through a traveling exhibit of his work, the Artists Guild of Eastern Illinois is paying tribute to a native son, the late Paul Turner Sargent. Born in Coles County, Illinois, Sargent attracted the attention of his teachers when he was quite young by drawing, with outstanding exactitude, animals and familiar scenes. He was encouraged to follow this career, and while in college illustrated some botany textbooks for Professor Otis Caldwell, and helped defray his expenses at the Chicago Art Institute by illustrating botany texts for Professor Coulter of the University of Chicago. Sargent became, however, a landscape artist with a sensitive and emotional interest in Nature, and his many canvases of Illinois scenes, noted for their rich colors, drew inspiration from Nature. Many of his paintings are found in private collections in this country and abroad, but the Artists Guild has been able to assemble an excellent group of loaned and estate-owned canvases for the memorial tour.

ARE YOU THIGMOTACTIC?

By Chapman Grant

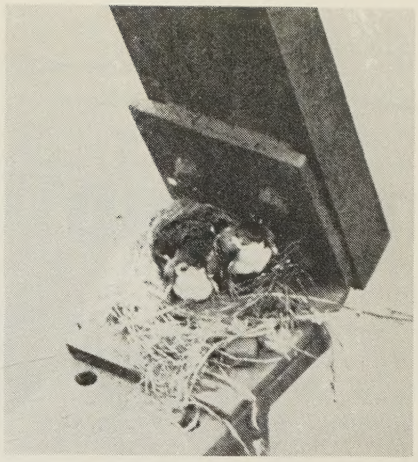
You are, doubtless, positively thigmotactic, but did you know it?

Here is the test. If you enter an eating place and automatically choose a table next to a wall or partition, you are positively thigmotactic, but if you gravitate to a center table and do not feel the desire to be "against a wall," you are negatively thigmotactic, like an antelope who likes the great open spaces and hates to be fenced in. The picture above was taken by Lee Passmore of a little Sphaerodactyl that hatched in California from an egg brought from Jamaica. The Sphaerodactyl is positively thigmotactic because he likes to hide under bark or stones. "Thigmo" means to touch, and "tactic" (taxis) means the desire for. Hence you and the Sphaerodactyl are brothers in the yen for feeling something solid to back you up. Now, "sphaero" means ball, and "dactyl" means fingers or toes, so this little fellow was named "ball-finger" because he has rounded finger and toe-tips, but who cares?

However, if you are nut enough *to* care, there is one publication in the world—and only one—devoted exclusively to the study of herpetology—reptiles and amphibians. It is a fairly technical leaflet, published for those who are making a hobby of reptiles. It is published irregularly at a slight loss by yours truly at 2970 Sixth Ave., San Diego 3, California, who states that when the membership in the Herpetologists League reaches 300 the darn magazine will be self-supporting, with no salaries paid, of course. Membership is three dollars.

DDT Warning

Damage to various kinds of animal life, especially commercially valuable fish and crustaceans, is likely to be widespread unless extreme care and knowledge are applied to the use of insecticides containing DDT, according to a report entitled "DDT: Its Effect on Fish and Wildlife." This publication, Circular 11 of the U. S. Fish and Wildlife Service, has been prepared by Clarence Cottam and Elmer Higgins, and is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The bulletin brings together studies of the effect of the insecticide as observed in controlled experiments, and some uncontrolled applications of the killer. Price of the circular is five cents.



KINGBIRD NEST

By Ira Eigsti

The operator of the Burlington water pumping station west of Buda, Illinois, discovered this site for a kingbird's nest. It was on the end of a bridge beam that protruded out over the water of the creek furnishing the water for the station. Of the three eggs laid, two hatched. Although this seemed a rather dangerous spot for a nest, particularly when the time came for the young birds to take wing, the younsters were safely fed and launched. It proved a very safe spot, far from interference.

Forest Fire Loss

Total timber and property damage from forest fires, on both protected and unprotected land, amounted to nearly twenty-seven million dollars during 1945, according to the United States Forest Service. The "cause record" of forest fires shows the following: incendiarists, 15,376 fires; smokers, 12,569; debris burners, 7,630; miscellaneous, 7,376; lightning, 6,713; railroads, 4,307; campers, 1,864; lumbering, 936. The number of fires declined from 131,299 in 1944 to 124,728 in 1945. The eleven southern States showed the largest figures for acreage burned over, or 15,341,268 acres out of the total burn of 17,680,703.

Wisconsin Deer

Of particular interest to students of wildlife and conservationists is a 96-page booklet entitled "A History of Wisconsin Deer" by Ernest Swift, assistant director of the Wisconsin Conservation Department. It is published as Publication 323 of that department at Madison 2, Wisconsin. Management of the deer population of Wisconsin has been a controversial problem for some years, and in this publication we find an objective discussion of the whole question and how it is being met. It is interesting to read as an example of how one approaches a wildlife conservation issue on a scientific basis.

Countin' up for 1946

It would take a lot of fingers (and toes) to count up how much the Bell System accomplished in 1946 — the busiest year in our whole history.

3,400,000 telephones added

25,000,000 more calls a day handled

$700,000,000 new equipment made and installed to expand and improve your service

1,800,000 orders for telephones cleared — of the 2,100,000 orders held on V-J Day

160,000 net increase in employees — total now 640,000

$400,000,000 increase in payroll

120,000 war veterans reinstated and employed since V-J Day

The story of the year was one of determined progress, despite shortages and many post-war problems. And most calls went through fast.

For 1947, the Bell System aims to go forward to still better service for more and more people.

BELL TELEPHONE SYSTEM

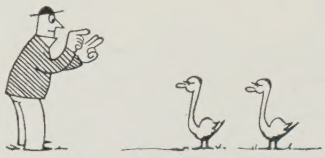
Contents Noted

MAGAZINE editors have been asked by the War Department, through the National Publishers Association, to cooperate in the current effort to build and maintain an all-volunteer Regular Army. We are asked to do our part, not the simplest or most logical thing to do in a magazine of our specialized character. About the only link between Nature and a volunteer army that we can think of is that modern soldiering includes understanding Nature and her forces; learning to live with Nature; applying the scientific approach to the business of soldiering. Such military philosophy results in specialization. The soldier with the scientific turn of mind, or with an interest in what goes to make up the outdoors, has an opportunity, in today's army, to develop those trends. He can thus enrich himself intellectually if he chooses. Soldiering, like war, is, in our opinion, largely waste, but so long as man remains still in a relatively primitive state, and is unable to rise above war, armies will remain his burden. If, then, we *must* soldier, let us have an army of men who elect this as a career through which they can improve themselves, and, at the same time, contribute to our country's welfare as we now see it.

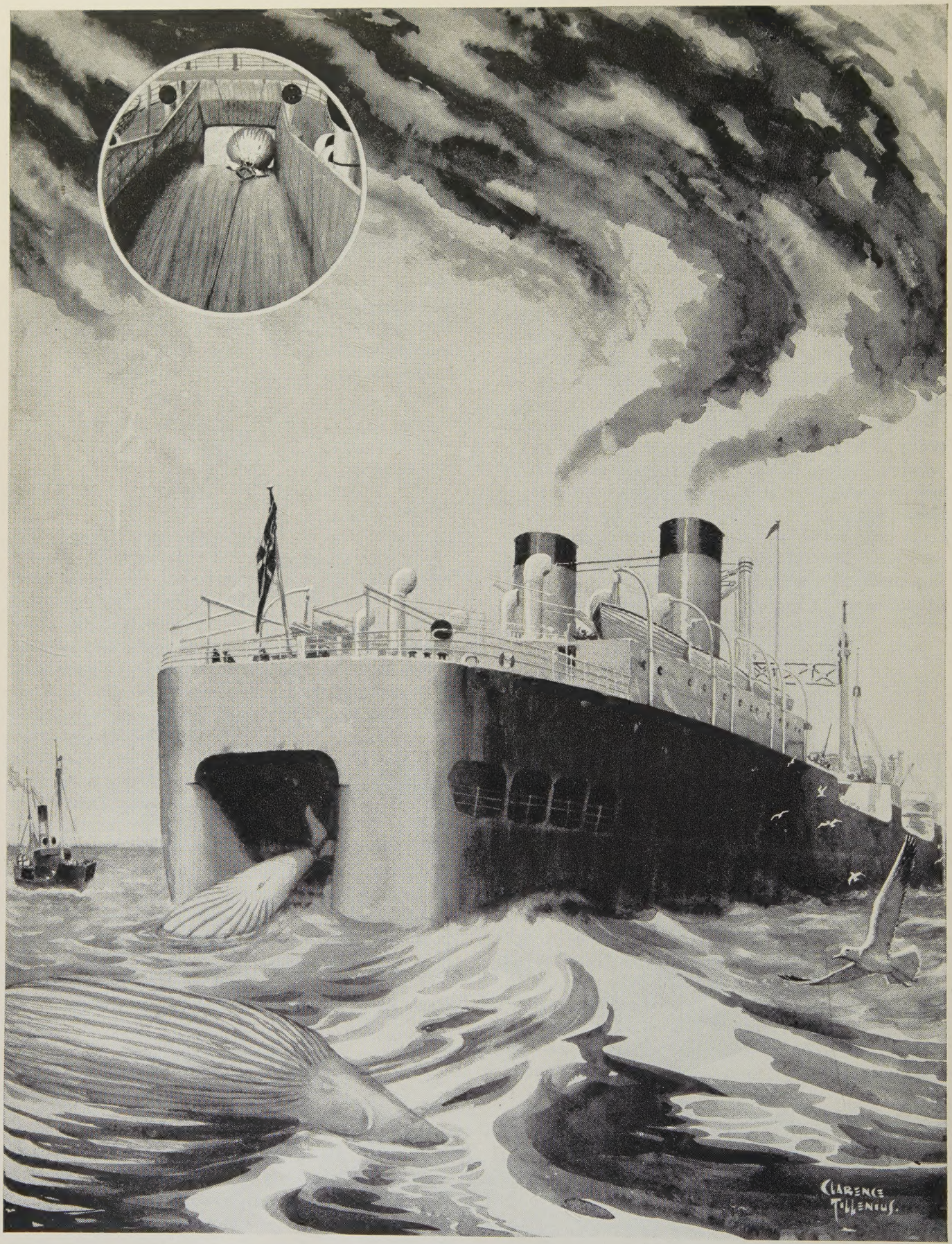
POINTING out that during each hunting season some five hundred gunners are killed, and about three thousand more injured by shots from fellow gunners, the American Optometric Association is conducting a campaign for better vision among hunters. Safe hunting, the organization says, requires ability to distinguish fine details under all weather conditions; ability to recognize and distinguish colors; ability to see objects or movement to the right and left of the target, while keeping eyes fixed on the target. Perhaps correction of faulty vision might help reduce gunning accidents, but all the optometrists in the world would have no effect upon the mental inadequacy of individuals who have no right to be abroad with a gun, causing most accidents.

IN THE October, 1946, issue of *North Dakota Outdoors*, Chief Game Warden E. M. Lee presents an interesting discussion of the decline of the pheasant population in his state, assigning reasons therefore. Commenting on cyclical theories to account for the fewer birds, Mr. Lee says: "There is only one kind of a cycle that hit 'em and that is the shotgun cycle." In another penetrating paragraph the warden proves that he is the kind of a game warden we would like to have around. Mr. Lee earns a medal for objectivity when he writes: "Predators compete with the hunter in taking pheasant in one way or another, and the predator list is quite a large one. We are, of course, the world's worst predator, but we dislike calling ourselves as such—we much prefer to be called sportsmen, even conservationists. We have become so highly educated in our methods of predation that we can take our prey at long range, while the other and lesser predators still depend on claw, tooth and talon for their share, but they usually cease when they have enough. We have other ideas, and our wits are becoming keener, no doubt."

THERE is, to us, something deeply pitiful in the pride with which the Fish and Wildlife Service reports that the population of the trumpeter swan in the United States now numbers 361 individual birds, an increase of 60 over last year. The pity arises from realization that we are the ones who reduced a once abundant and beautiful bird to the point that, at the turn of the century, it was thought to be extinct. Trading in the bird's down and breast skin was a factor in starting it on the down grade; other activities of civilization sent it farther. Gradually, through protection of the birds and their habitat since 1924, the numbers have been increased from 73 in 1935 to the present figure. This increase has been aided recently by a closed season on snow geese in Wyoming, Idaho and three counties of Montana, declared so that gunners would not have the excuse that they shot a swan in mistake for a goose, although in size and markings the birds are quite distinct. We may take some satisfaction from the slow restoration of this bird, but we should learn a lesson from man's heinous history in its bloody destruction.



"NOTE on the decline and fall of the Great Outdoors." say the *New York Times*. "A New England al fresco advertising company has announced that it is studying ways and means of using television on roadside billboards. The billboards, it is said, thus will be able to carry news and 'public service features' as well as advertising. Maybe it would be a greater public service just to forget the whole thing." R. W.



Today the whale is just so much raw material gathered into such "floating factories" as this. The whale being drawn in on the ramp and the whale floating in the sea are Finbacks. The boat approaching at the left is one of the small "whale catchers" with harpoon gun mounted on the prow. Inset, is a view from above the "factory," showing a whale being drawn in from the sea.

"Thar She Blows!"

Whaling Ages, Golden and Otherwise

By IVAN T. SANDERSON

Illustrated by Clarence Tillenius

THE SO-CALLED "Golden Age" of whaling was not at all "golden" for those who lived in it. The really profitable time is right now, for today the number of whales taken from the sea each year is ten times more than in the heyday of the industry in America when, in 1850, nearly 700 square-rigged whalers sailed from the ports of New England alone.

Nor is whaling any longer the dangerous calling that it used to be when hand harpoons were thrown into the sixty-foot monsters from little rowboats, and when men and boys stood on oily carcasses in the open sea, wielding razor-sharp flensing knives. Any romance that may have been attached to the stately sailing ships, the fabulous profits, and the exhilarating cry of "Thar she blows!" has gone forever. Whaling today is big business. It is a precise, methodical and scientifically planned enterprise involving 20,000-ton floating factories, 1000-horsepower winches, batteries of pressure boilers, and other complex machines. The whale is no longer a huntsman's quarry; it is just eighty tons of raw materials to be fed into gigantic processing systems out of which come various grades of oil, meal for cattle and chicken feed, and fertilizer—all of which has great bearing on the fate and future of what is left of the oceans' whales.

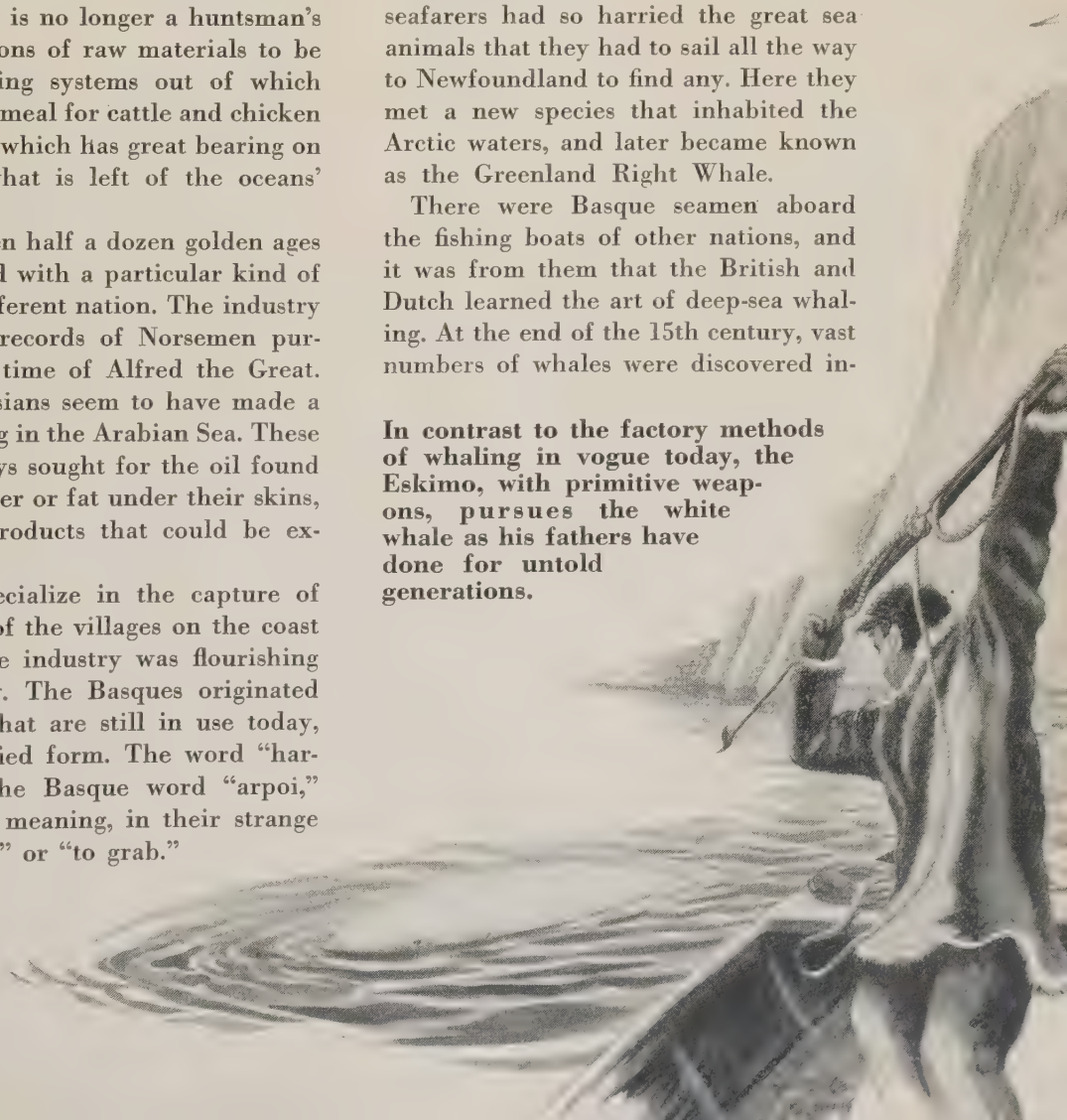
Actually, there have been half a dozen golden ages of whaling, each connected with a particular kind of whale, and each with a different nation. The industry is ancient, for there are records of Norsemen pursuing this activity at the time of Alfred the Great. Centuries earlier, the Persians seem to have made a practice of offshore whaling in the Arabian Sea. These great mammals were always sought for the oil found in the thick layer of blubber or fat under their skins, and for other valuable products that could be extracted from them.

The first people to specialize in the capture of whales were the Basques of the villages on the coast of the Bay of Biscay. The industry was flourishing by the thirteenth century. The Basques originated the methods of whaling that are still in use today, although in greatly modified form. The word "harpoon" is derived from the Basque word "arpoi," which has the stem "ar," meaning, in their strange language, "to take quickly" or "to grab."

The Basques built watch towers along the coast, and when a whale was sighted they put out in small boats and surrounded the animal, throwing harpoons and lances into its flanks until it bled to death. They then towed it ashore. Later, they built specially equipped ships, and, as the whales were killed out in home waters, the Basques sailed ever farther into the Atlantic in pursuit of their quarry.

The whale the Basques hunted was a species known as the Black Right Whale, which once ranged throughout the temperate seas of the world. It was known as a "Right" Whale simply because it floated when killed and was therefore the *right* kind to hunt. All other known kinds sank when killed. It is now practically extinct; of nearly 40,000 whales killed throughout the world in 1935, only four were Black Right Whales. It has been estimated that less than a thousand whales were killed in a hundred years by the twenty Basque villages most famed for their whaling prowess. Yet, by the end of the fourteenth century these adventurous seafarers had so harried the great sea animals that they had to sail all the way to Newfoundland to find any. Here they met a new species that inhabited the Arctic waters, and later became known as the Greenland Right Whale.

There were Basque seamen aboard the fishing boats of other nations, and it was from them that the British and Dutch learned the art of deep-sea whaling. At the end of the 15th century, vast numbers of whales were discovered in-



In contrast to the factory methods of whaling in vogue today, the Eskimo, with primitive weapons, pursues the white whale as his fathers have done for untold generations.

Whaling today is no longer the perilous calling that it was in the days when hand harpoons were thrown into the great sea animals from little rowboats on the tossing ocean.

habiting the bays and fjords of Spitzbergen. The Scotch and English crowded north, and by the middle of the 16th century there was a thriving industry there, with permanent shore stations from which the whalers worked. Then the Dutch arrived, and war broke out between the two countries over the whaling rights.

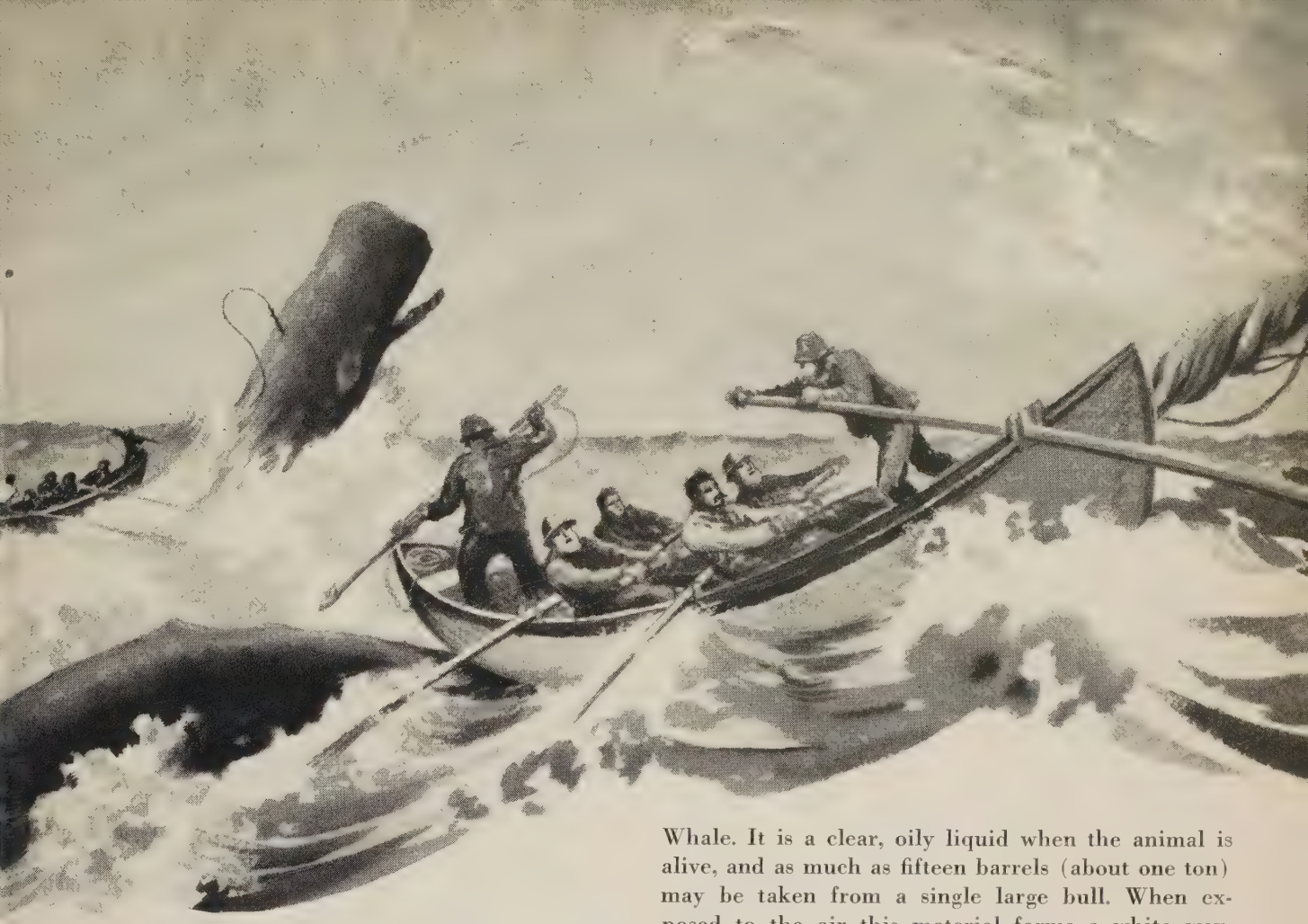
Despite hostilities, however, the industry continued to grow. Sometimes as many as fifty whalers were working in sight of each other. Men were lost in the icy waters on every trip, but the profits were great. The most valuable part of the whale in those days was the whalebone or "baleen," a strong, flexible material of which one whale might yield as much as one and a half tons. The Greenland Right Whales have about 330 plates of baleen on each side of their upper jaw. This structure is greatly accentuated in these whales and developed into a series of narrow plates, ten to fourteen feet in length. These are arranged about a third of an inch apart, like the plates in a battery. Their inner edges are shredded into a fringe of fine hairs, which become tangled together and form a continuous mat that lines the whole roof and sides of the great mouth. Baleen or "bearded" whales feed by swimming through the sea with their mouths open. The water is strained through this mat and escapes outward between the lips, while all small forms of life are caught among the hairs. The enormous tongue then wipes the mat backwards and the food enters the tiny throat.

Baleen was used in making umbrellas, women's corsets, sofa and carriage springs, and, when shredded, for the plumes on helmets. It sometimes commanded a price of $10,000 per ton. Oil, which was then taken only from the blubber, was also valuable. This is still called *train-oil*—from the German word *tran* meaning *fish-oil*—and was the purest and lightest oil then known. It was employed in softening leather, for making soap and paint, as a lubricant, and, more especially, for lamps to light houses and streets.

The pursuit of the Greenland Right Whale began in earnest in 1611, for the Biscayan or Black Whale was rapidly disappearing. This gave the Dutch a great advantage, for they had developed special methods of hunting along the fringe of the Arctic ice where this species abounded. By the middle of the century they had captured the trade, and they held it for a hundred years. Their headquarters in Spitzbergen was a permanent settlement called Smeerenburg, or Blubbertown, and a thousand whalers sometimes visited this desolate place in the course of a year.

But the history of whaling is a sad and repetitious one. A species of whale is found, some seafaring people devise methods of catching it, tremendous profits are made, then the whale begins to get scarce and eventually disappears so that the industry dies. The end of the Greenland Right Whale was hastened, however, by the institution of a bounty offered on whale oil by the British Government.

The early colonists in New England found that the Indians killed whales that entered shoal inlets



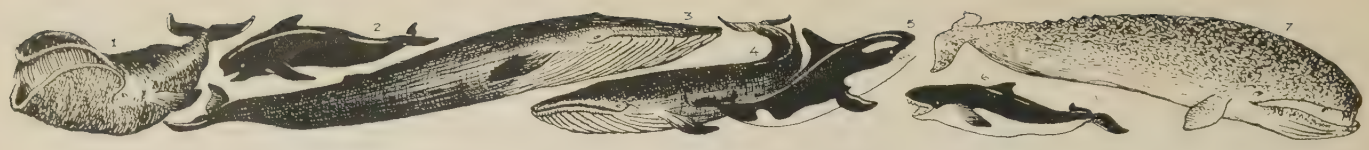
by driving them aground with bone-headed harpoons attached to ropes made from bark. Whales were extremely plentiful along the coast, and all the settlements had stringent laws concerning the rights to drift whales that were washed ashore. By the middle of the 17th century, off-shore whaling was in progress from Long Island to the St. Lawrence, with Southhampton playing a prominent role. Indians were employed at three shillings a day and were paid in whale oil. By 1670 Boston had fitted out a fleet of little pinnaces to cruise along shore to watch for whales.

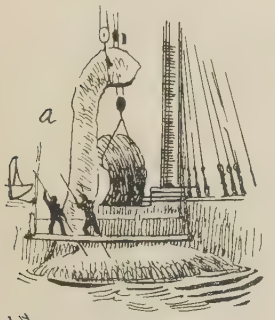
Then, in 1712, something occurred that perhaps changed the course of history. A certain Captain Christopher Hussey, cruising off Nantucket in search of Right Whales, killed a Sperm Whale by mistake. This species was a rarity thereabouts, but the oil of Captain Hussey's animal proved so valuable that the event greatly excited the colonists. With a new enthusiasm, which rapidly spread all up and down the coast, regular deep-sea whalers were built. These put to sea for six weeks at a time, carrying hogsheads in which to bring back the blubber and the more precious *spermaceti.*

Spermaceti is found in the forehead of the Sperm Whale. It is not an oil but a liquid wax, the chief constituent of which is a substance known to chemists as *cetyl-palmitate.* It was originally thought to be the "spawn" of the whale, hence the name Sperm Whale. It is a clear, oily liquid when the animal is alive, and as much as fifteen barrels (about one ton) may be taken from a single large bull. When exposed to the air this material forms a white wax. Refrigerated, the heavy wax is squeezed out and the liquid residue is valuable for the lubrication of spindles and light machinery. Earlier it was used for ointments and in making candles.

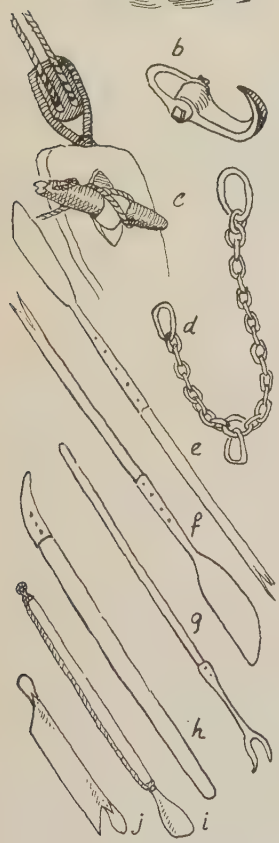
Britain's war with France resulted in the capture of Canada in 1761, cost the British Government a great deal, and sent it looking around for some new source of revenue. The colonial whaling enterprise was such a source, and a bounty of twenty shillings a ton for whale oil was offered, as well as exemption from His Majesty's draft for all men engaged in whaling. By this time the north Atlantic was practically devoid of all Right Whales, and the British and Dutch whaling fleets had moved to Davis Straits, between Labrador and Greenland, and soon the Greenland Right Whale was all but exterminated. Whalers turned to the Sperm Whale, inhabitant of the warmer seas and still plentiful to the south. Also, British whalers had entered the Pacific before 1800; found that the Black Right Whale was still abundant south of the warm tropical seas. New Englanders followed the British.

In 1850 there were 680 whalers sailing out of Nantucket, New Bedford, Boston and other New England ports, and all but forty were hunting in the Pacific. Ships sailed almost daily. Boys grew up in the smell of train-oil, amidst tar, ropes, canvas and shipwright's shavings. They clamored for berths on the whalers. Sometimes captains even took their wives on their





Above are pictured several whales. (1) "Bowhead" or Greenland Right Whale, growing up to 65 feet. (2) "Blackfish" or pilot whale, up to 28 feet. (3) Blue whale, growing to 100 feet, and the largest mammal. (4) Finback, which may reach 80 feet. (5) Killer whale, which grows to 30 feet. (6) Pigmy sperm whale, which rarely exceeds 13 feet. (7) California gray whale, which may be 50 feet long.



At left, methods and tools used in whaling. (a) Stripping off blubber. (b) Blubber hook. (c) Cutting tackle toggled to "blanket piece" use in strip blubber. (d) Fin chain. (e) Hand spade. (f) Cutting spade. (g) Blubber fork. (h) Blubber pike. (i) Boat spade. (j) Mincing knife with which the large pieces of blubber are deeply scored to facilitate the trying out of the oil.

voyages. One bride sailed on her wedding night and did not see home again for three and a half years. Work proceeded under blazing tropic suns, and in the frozen polar seas. Whalers stayed at sea until their 'tween decks were crammed with oil casks and baleen.

However, men still leaped to the oars at the cry of "Thar she blows!", risked capsizing and death from the flailing tail of the wounded quarry, or rode the waves for miles, towed by the whale when the harpoon "took." Quarters were often cramped and verminous. Discipline was strict.

After the Civil War, the American whaling industry began to die away. This was partly due to the extermination of the Right, and the dwindling number of Sperm Whales. Also, whale oil could not compete with petroleum products for lighting purposes. By 1900 "sperming" was dead—exploitation had triumphed.

Modern whaling began at the turn of the century with the invention of the Sven Foyn harpoon gun and the steam whaler. The *Sven Foyn* fires a hundred-pound, four-foot harpoon, itself loaded with an explosive charge timed to explode three seconds after it has penetrated the whale.

The modern steam whale-chasers are sturdy little ships of 300-350 tons, about 130 feet long, with powerful engines and a speed of some fourteen knots. They have flared bows to throw the water from the gun platform and a greatly cut-away fore-foot below water to aid in quick turning. They carry a crew of eleven men besides the gunner, who is also the master. They, like the Sven gun, are a Norwegian development.

Thanks to the relatively great speed of these chasers, their powerful winches, and the strength of the cables attached to the new and deadly harpoons, it no longer mattered whether the whale floated or sank after death. Thus, species that had always been plentiful, but previously could not be utilized, became the quarry. These were the Rorquals, a larger, slenderer and more speedy type, related to the Right Whales and, like them, carrying baleen plates in their mouths. With modern equipment, the Norwegians rapidly reduced the remaining whales in the North Atlantic.

Despite the tremendous development of petroleum, the researches of chemists, and the early plastics industry, there were new and urgent demands for all whale products. Whale oil was found essential in the manufacture of high grade soaps, for explosives, for "quenching" steel plates, and, by hydrogenation, for the production of a tallow-like edible fat. Spermaceti was still in great demand, and there was also the remarkable substance called ambergris, found in the stomach of the Sperm Whale.

This gray, waxy material with an earthy smell is thought to be the product of gigantic colics produced in the stomachs of the Sperm Whales through irritation set up by the bony beaks and sucker-rings of the giant octopuses and squids upon which they feed. In the early days ambergris had been valued, quite mistakenly, as a medicine. Now it had been found to be the ideal "fixative" for the volatile oils and other aromatic fluids of which expensive perfumes are made.

Whale meat was eaten in Japan and Norway, and, in the latter country, special refrigerator cars carried it from the ports to the cities. There are approximately two and a half tons of prime cuts in a whale, and this was sold at half the price of beef. This item was of small value, but it was also found that the whole whale, apart from the blubber, produced not only oil but other valuable products. After flensing the blubber, the flesh and bones, if cut up and boiled,

give more oil of several grades, and the residue, when dried, forms whale meal—an important constituent of cattle and chicken feed—and whale guano, which is an excellent fertilizer.

The value of these products gave a new impetus to the whaling industry, and Norwegian whalers moved to stations founded at the Falkland Islands, South Orkneys, South Shetlands and South Sandwich Isles in the south Atlantic.

At first, *modern* whaling was conducted from shore stations where there was an abundance of water, but it was soon found that factory ships carrying boilers and condensers for production of fresh water from sea water could more profitably do the work. Thus the gradual development of sea-going factories added efficiency to operations and speeded inroads into the whale population.

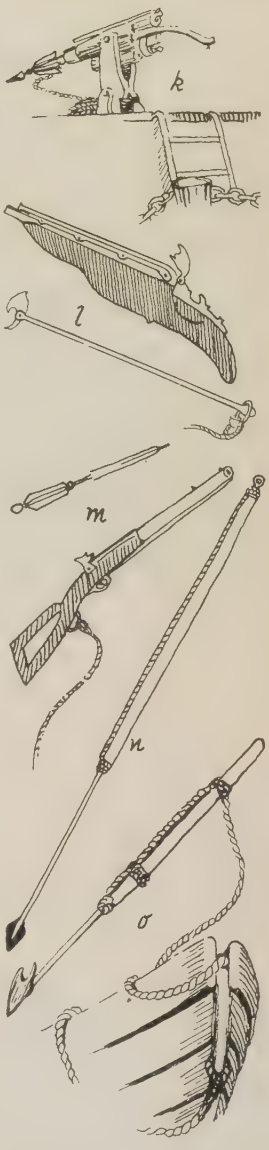
International figures are not available since the outbreak of war, but the number of whales killed per year had steadily risen since the beginning of this century. In 1920, 11,369 were taken; in 1931, 43,129, and in 1938, 54,835. But because the whales caught were smaller, the production of oil did not rise accordingly. In 1931, 3,701,668 barrels were obtained, while in 1938 only 3,640,248 came from 54,835 whales. Not counting the Japanese activity, the percentage from the Antarctic rose from 2.3 per cent of the world total in 1903 to 55 per cent by 1910, and 84 per cent by 1936. Production increased enormously with the outbreak of war because of the importance of whale oil to war industry.

Whaling is now virtually a Norwegian enterprise. Of 12,705 men employed in the whale ships in 1939, 7517, or almost two-thirds, were Norwegians. Of the rest, 1386 were German, 866 British and only 143 of other nationalities. There were 2793 employed in the quite separate Japanese industry.

The Right Whales have long ago been practically exterminated, and present-day whaling is almost entirely a Rorqual industry. The Sperm Whale, which is a denizen of tropical and temperate seas, and of which only old bulls are found in the Antarctic, has also been greatly reduced in numbers. Of the 54,835 whales caught in 1938, only 3308 were Sperms. Moreover, only two species of Rorquals are now hunted extensively. These are Sibbald's Rorqual, or the Blue Whale, and the somewhat smaller Common Rorqual, or Finner Whale.

These whales originally had a worldwide distribution, but both preferred cold waters outside the tropics. They were always more numerous in the southern hemisphere. Both make a seasonal migration of about 2000 miles to the warmer waters of the temperate zone to breed during the winter, and back to the cold waters to feed and fatten during the summer.

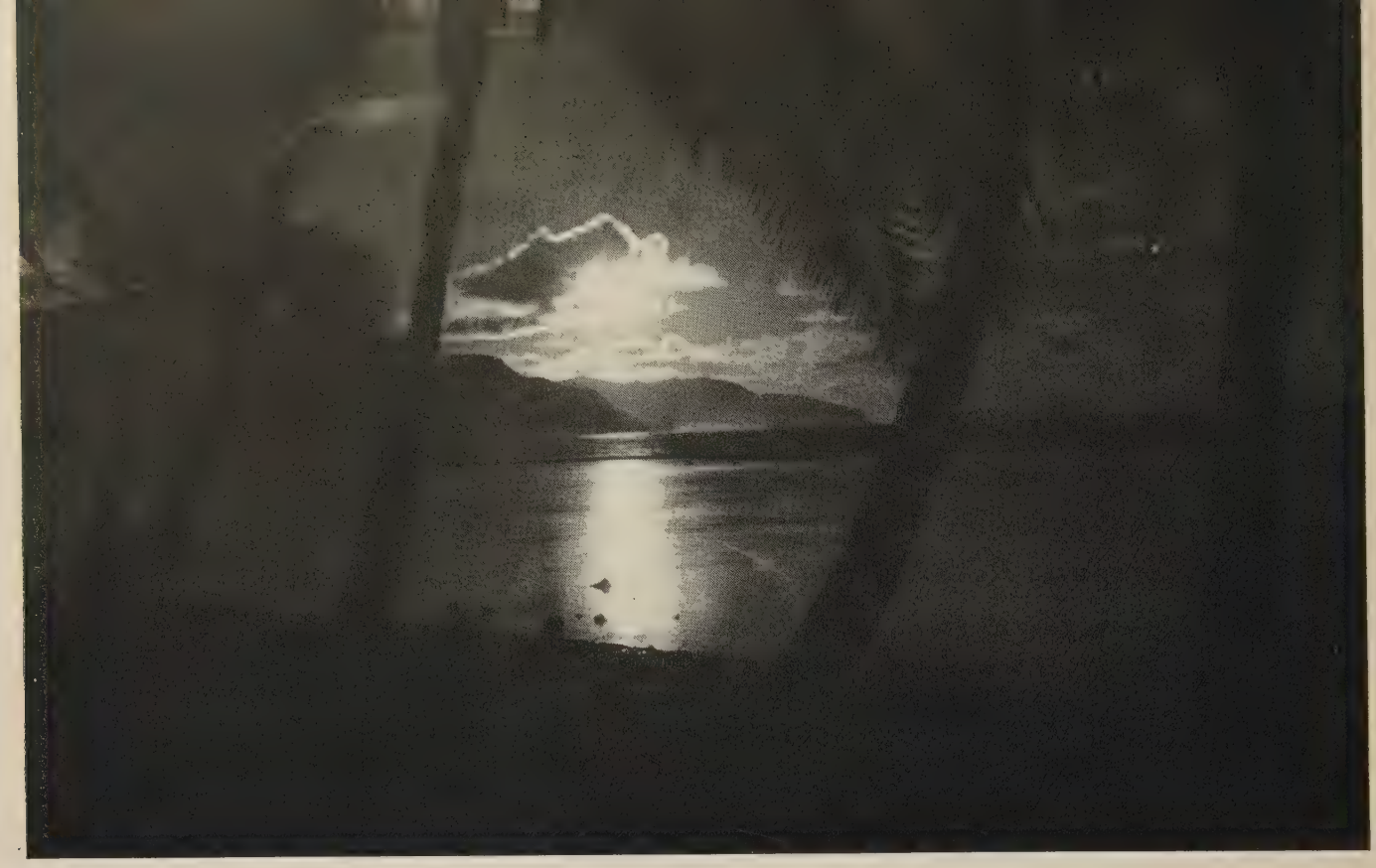
More whales. (8) Pigmy Right whale, growing up to 20 feet. (9) Sei whale, which may be 56 feet. (10) Little Piked whale, growing to as much as 33 feet. (11) White Whale, or Beluga, attaining up to 14 feet. (12) Black Right Whale, which may be 50 feet. (13) Bottlenose, which grows to 30 feet. (14) Humpback, recorded as much as 48 feet. (15) Sperm Whale, which may be as long as 65 feet.



More equipment used in whaling as it is practiced today. (k) The modern harpoon gun, which is mounted on the prow of "whale catcher" boats. (l) The old time harpoon gun and harpoon. (m) A shoulder gun and harpoon, the gun usually made of bronze. (n) Hand lance, used to kill the whale after harpooning. (o) Hand harpoon, showing the front of the boat and method of attaching the rope.

The food of these great creatures is a little shrimp two inches long, known to scientists as *Euphausia* and to the whalers as krill. These appear each summer in vast shoals in the polar seas near the ice. It is interesting to note that the larger Blue Whale eats only krill and only the small, immature ones at that, while the smaller Finner eats a certain amount of herrings or capelin fish, but only the mature and larger krill.

The Blue Whale is the greatest creature that has ever lived. The male measures up to 90 feet in length, and females of 100 feet have been taken. Females of comparative age are usually about two feet longer than the males. Precise weighing has borne out the whalers' contention that Blue (Continued on page 50)



"Cast on the water by a careless hand,
Day after day the winds persuaded me,
Onward I drifted till a coral-tree
Stayed me among its branches where the sand
Gathered about me, and I slowly grew,
Fed by the constant sun and the inconstant dew."
The Coconut (1842)

That Wonderful Coconut

By WILMON MENARD

AIR FORCE pilots during the Pacific war came to love the coconut palm, particularly those who crashed at sea. Adrift in a rubber boat under a blazing sun, a chance coconut floating by might decide a fate of life or death. Commandos and patrols, cut off behind enemy lines on South Pacific isles, were able to subsist for days upon the meat and water of the coconut. The broad green fronds of the palm provided shelter and concealment.

Coconut palms, the pennants of Polynesia, are without a doubt the most generous blessing Nature has bestowed upon the natives of these tropical latitudes. The stately palms, their fronds flying in graceful disorder in the tradewinds, never fail to quicken the pulse and inspire thoughts of adventure and romance.

My first sight of the coco palm was from the deck of the passenger-steamer that was carrying me to the South Pacific island of Tahiti. We had been steaming south for many days, and were nearing this central isle of French Oceania when a faint blue smudge was detected on the horizon. A few hours later the haze had dissolved. In its place was a series of low coral islets—the Tikahau atolls—an outflung reef of the extreme westerly section of the vast Tuamotu or Dangerous Archipelago. It was a welcome and entrancing sight after so many days at sea, out of sight of land, ship or bird. It was a perfect tableau. The garland-shaped atoll stretched as far as the eye could see, adorned by the yellow-green of the waving palm plumes, bathed by the ultramarine waters of the south ocean tumbling in foamy turbulence upon the white coral strands. We were so close that we could see the small coconut huts of the natives nestling under the shade of the palms. The sight of the coconut atoll had brought most of the passengers to the railings.

"Can it be possible that people actually live on those low coral islands?" asked my neighbor. "I understand that it's one of the most remote atolls of the Tuamotu Group and rarely visited. Aside from the fish in the reef-locked lagoons, I can't say I'd

The village of Tae O Hae, Nuka Hiva Island in the Marquesas Group. Shading the native palm huts, the coconut palms are stately sentinels of the South Seas, and the first sight a visitor has of the island beaches.

relish the diet of those poor devils—fish and coconuts, with perhaps a tin of bully-beef once in two years."

Later I had an opportunity to visit this same atoll on a trading-schooner, and found that the "poor devils" were extremely gentle, happy and healthy, with no thought of deserting their low coral atolls for the more civilized, mountainous islands to the south, where the canned foods of the white man can be readily obtained. The meat of the nut prepared in many different ways gives them a nourishing food, and its effervescent wine provides a healthful drink. I noticed particularly the soundness and whiteness of the natives' teeth—the result of chewing the hard meat of the mature coconut.

The original home of the coconut palm, *Cocos nucifera,* has been widely disputed. Many students of palms claim that its first location was in South America; others contend Africa was its home; some say Hawaii. A large majority argue that the islands of the South Pacific, where the palm flourishes so vigorously today, were the natural abodes of *Cocos.* However, intensive research points toward the East as the first known home of the coco palm.

Marco Polo, in his early travels in the Orient, two centuries before America was discovered, speaks of the "Indian nut," which he found growing in northern Sumatra and along the eastern and western coasts of southern India. He says:

"The Indian nut also grows here, of the size of a man's head, containing an edible substance that is sweet and pleasant to the taste, and white and mild. The cavity of this pulp is filled with a liquor clear as water, cool, and better flavored and more delicate than wine or any other kind of drink whatever."

Perhaps no more active agents for the propagation of the coconut palm can be found than the giant land-crabs, *Birgus latro,* which have forsaken the sea, and, save for brief dips in the shallow waters of the

The milk of the coconut provides a healthful and nourishing drink, and the meat provides a major food for the island people.

All coconut, indicating the importance of this tree to Polynesia—coconut canoe, coconut shade and coconut huts.

lagoon, live entirely on land. These crabs are not found in America or Hawaii, but abound in great numbers in the Tuamotu Islands of the South Pacific, the Leeward Isles, Fanning Islands, and many isles of the Indian Ocean. When coconuts are washed on an island beach, after many days' journey in the oceanic currents, these crabs immediately seize and drag them inland. Then, striking at the soft end, or "eyes," of the nut, they penetrate the shell and eat the meat. There are, of course, many coconuts dragged from the beach that are left to take root in the sand.

The coconut palm, in its physical growth, reminds one of the life of man. Nature is kind to the tree as a sapling, and through its period of its mature strength and productiveness; and its life in years is remarkably like that of man. But the time comes when the trade-winds blow with stronger force, and the old tree, as with man in his declining years, crashes groaning to the ground.

And when one considers the varied and bounteous gifts that these kindly, handsome aborigines derive from the stalwart, fruitful tree that thrives in the otherwise almost barren islands and atolls of the South Pacific, one must be impressed with the inherent kindliness of the God of Nature, for the coconut supplies nearly everything necessary for a normal, healthful life.

While voyaging among the primitive atolls of the Tuamotu Group, northeast of Tahiti, I stopped on many coral isles where the natives had no food other than the meat of the coconut and the fishes of the deep blue lagoons. In different stages the growth of the nut satisfies man in the gradual stages of his development. Close to my native hut on the atoll of Takaroa, in the Tuamotus, was the thatched home of a stalwart pearl diver. We became fast friends. The death of his pretty young wife in childbirth, although of great personal tragedy, did not permanently subdue his cheerful disposition. I pitied the tiny infant, bereft of its mother's milk, but not for long. From the moment it came into the tropical world clamoring for nourishment, it was fed the jelly of the young coconut. I found that this is frequently the case, with fine results, throughout Polynesia. Considering the finished product—the lithe, healthy, strong children of the Tuamotus—perhaps the infants of civilized countries could have no greater good fortune than to be marooned in an island village of the South Seas and be suckled on the jelly of the young, green nut.

Many old, toothless men of the islands depend entirely on this soft jelly for food. The hard meat of the mature nuts is chewed in great quantities by the stalwart younger men of the isles.

The fermented meat of the half-ripe nut can be made into many varieties of cheese, and excellent candy is made from the desiccated meat. Palm sugar is made from the juice drained from the flower spathe. A strong drink, called *arrack*, is distilled from the liquid drained from the bruised flower clusters and buds.

Mauu, a native of Tahiti, informed me one day that the coco palm, in heathen times, afforded the

Close view of a native Polynesian hut, showing the way in which the palm is used as a building material.

natives of Tahiti a place of refuge during frequent visits of marauding cannibal warriors from Moorea and other outlying islands.

"Many times the war canoes would land, and the eaters of human flesh would find that not a person was to be found in any of the villages," Mauu explained. "The invaders knew that the Tahitians had climbed the palms, but which ones they were unable to tell. Their spears could not reach sixty or eighty feet into the air, and they would not dare to climb the palms to investigate. The Tahitian, high in the tree, could drop a heavy nut upon the head of the foolhardy warrior, or send his spear downward into the perfect target. The Tahitian could remain in the palm for many days because he had food and water within easy reach."

One day I tried this novel hiding-place, to see how well I could live, bird-fashion, in the top of a coco palm. With a cinch of hibiscus bark stirrup-fashion around my bare feet, I climbed the trunk of the palm, progressing rapidly with the aid of the bark, which tenaciously gripped the ridged bole of the palm. Once up to the point where the fronds started from the trunk I moved more slowly, bending aside the leaves with my free hand to allow clear passage. I soon had a comfortable seat in the tufted top of the palm, completely concealed from below. I straddled two palm-butts, with my back resting snugly against a back-rest of fronds. It was a cradle. I had the agreeable sensation of being rocked gently in the brisk trade-winds. I could see many miles out to sea, and could make out numerous outlying islands that it was impossible to see from ground level. It was possible to nap without danger of tumbling to the ground, for the leaves closely supported me. Waking from a brief snooze, I was both thirsty and hungry.

Twisting off a young nut, I looked about for some sort of husking instrument. The point of the unopened bud of the coconut is sharp and flint-like. This would serve to husk the nut of its fibrous exterior. I succeeded in skinning it quietly and wedged the fragments into the bases of the fronds. With the point of the frond's midrib I punctured the "eyes" at the small end of the nut, then made them larger by pressing strongly with my forefingers. The wine bubbled forth. Raising it quickly to my lips, I drank long and deeply of the cool, refreshing liquid. When I had drained the last drop, I held the nut on its side, and, turning it slowly, gave it a series of gentle raps against the trunk. I turned it three times, striking it sharply, and suddenly it broke apart exactly in the center. I ate the soft jelly of the young nut with a crude spoon provided from a part of the husk. There, high in the top of the palm, I passed the day, eating, drinking, and gazing far out to sea. In like manner many Allied soldiers had been compelled to live for days on end. I found it could be done.

A native climbs into a coconut palm to reach the prized fruit. Below, the gala attire of the natives for the ceremonials and dances is made up of parts of the cherished coconut palm.

A large number of articles are made from the wood and leaf of the coconut palm. The drums used for the native dances are made from the base of the bole; a broom is made from the stiff midribs; the old flower clusters, after they have been dried, make ideal garden rakes; the fronds offer material for the only houses most South Pacific islanders require. The hat I wore, rain or shine, was made by a kindly Tahitian granny from the dried young leaves; the mat I used for sleeping was merely a large square of plaited palm leaves; and the sail of the sailing-canoe that transported me from atoll to atoll in the Dangerous Isles was made of tightly plaited palm leaves.

The palm frond, soaked with candlenut oil, is used as a torch in night fishing. The stiff midribs, with their sharp points, are bound to a long pole and used to spear small fishes. The meat of the nut is chewed and then expelled by swimmers under water to "chum" the schools of edible (Continued on page 48)

World Wide Plants in One Park

By DOLORES BUTTERFIELD JEFFORDS

★

The golden dome of California's State Capitol building at Sacramento is symbolic of the State's mineral wealth. The surroundings, however, comprise a collection of growing things from all over the world. The view here is of the Capitol between plantings of California Washington palms.

THROUGHOUT our country, state capitols have a certain sameness. Their architecture presents variations of an accepted and typical pattern. The grounds display the trees, flowers and shrubs indigenous to the particular locality, the purpose being simply to provide a suitably imposing and attractive seat of government for the particular state. But California's Capitol Park in Sacramento is actually propaganda on a large scale.

The building itself—with its golden dome, symbolic of California's golden mineral wealth—does not differ radically from the conventional designs of other state capitols. But the grounds and park are given over to developing the theme that virtually every growing thing will thrive in the soil and climate of California. Not only are varied representative trees and shrubs of many other sections of the United States represented in the Capitol Park grounds, but, in an area five blocks long and two blocks wide, comprising some thirty-six acres, are gathered trees and plants literally from the four corners of the earth.

There is, to be sure, a section of the park devoted to the flora of California—not just the species that grow round about Sacramento, in the central valley, but specimens from mountains and coast, from the Oregon line to the Mexican border: Monterey pines and Monterey cypresses; white oaks, blue oaks, and valley live oaks; the Douglas fir and Sitka spruce, and beautiful incense cedars; plane trees and redbuds; giant sequoias from the coastal fog belt and from the Sierra. There is even a miniature desert, displaying many dryland plants, such as the giant saguaro cactus, prickly-pears, manzanita and greasewood, to unbelievably tiny and fragile-looking plants from the more arid sections of Death Valley and the Mojave Desert.

Another interesting and wholly American feature of the park is the Memorial Grove dedicated to the Union Veterans of the War between the States. According to the legend on the memorial stone, the grove consists of trees transplanted as saplings from the various battlefields of the war, each tree being marked with the name of the battlefield from which it came—a silver maple from Antietam, a white ash from Vicksburg, a scarlet maple from Chancellorsville, American elms from The Wilderness and Gettysburg, and so on. There are about thirty trees in the grove, including trees from Arlington Cemetery, and from the tombs of Lincoln and McKinley.

The balance of the park, however, displays trees

from other continents. An outstanding attraction is the row of twelve majestic deodars from the Himalaya Mountains in India, these extending along the front of the Capitol grounds. They shade a delightful walk, as well as benches that invite the visitor to linger. Also from Asia come the dark, luxuriant camphor trees that offer, on warm days, such dense and grateful shade, the graceful maidenhair tree, the windmill palm, the albizzia, or silktree, and many other beautiful trees and flowering shrubs. Near the gardener's cottage is a magnificent cedar of Lebanon, one of the most notable attractions.

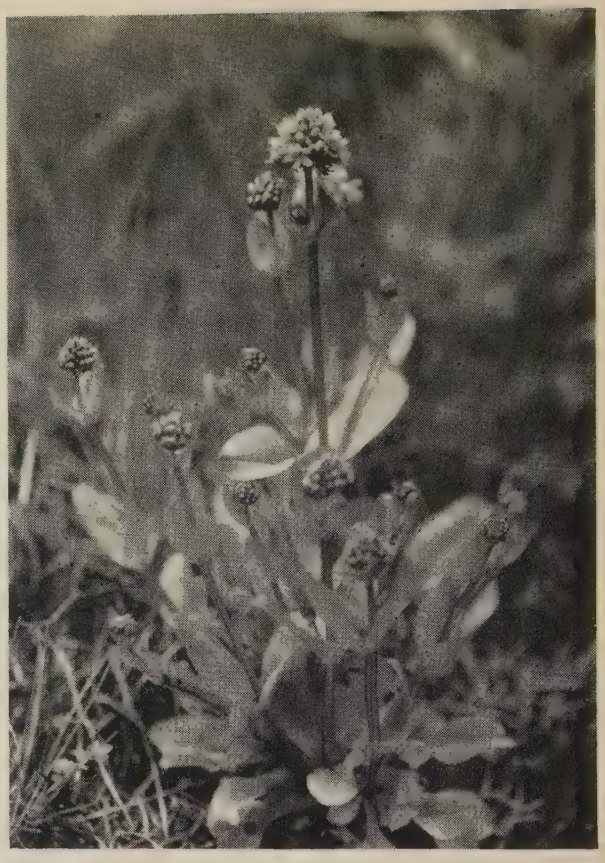
The grounds were originally planned to present an alpine-tropics contrast. Canary Island date palms and California Washington palms form a foreground for the stately Himalayan deodars, and on the terrace behind the deodars, paralleling them, is a row of *Magnolia grandiflora* from our own South. Fan palms contrast with Italian stone pines; Norway spruce with Florida yew and dogwood. But the theme was enlarged, with the park, to include more than the flora of tropics and mountains, and is now a living botanical museum.

A few of the specimens, however, are more curious than beautiful. In this class are the Australian bottlebrush and lemon bottlebrush trees, which belong to the myrtle family. An even more striking curiosity, however, is the *Araucaria imbricata*—more familiarly known as the monkeypuzzle tree—from the Chilean Andes. The Araucarian Indians of Chile, for whom the genus is named, are said to obtain much of their food from this tree, and to eat it "raw, boiled or roasted"—an item of information that, alone, would cause one to gaze with speculative wonder at this strange, bristling tree, its limbs all sharp angles, twisted and intertwined.

The monkeypuzzle tree, or *Araucaria*, is one of the trees representing South America, coming from the Chilean Andes.

It would be too much for a single article to describe in detail the individual features of the park. To those interested in the study of botany it is a veritable wonderland, affording an opportunity to see at first hand plants from across the world; to examine, in a compact space, outstanding species of both hemispheres. But one need not be a botanist to enjoy and appreciate the beauties and curiosities of this park, even though he may not be able to detect the alpine-tropics scheme of the grounds immediately surrounding the Capitol building, or identify at a glance specimens from distant shores and differing climates. And to all who look may be revealed a larger theme—the significance of plants from widely differing latitudes growing side by side. It seems symbolic of our country as a whole, wherein the nations of the earth have met and mingled to form a new and virile commonwealth.

Another view of the Capitol Park at Sacramento, showing the wide variety of trees and shrubs that prosper there and make the spot a delight to the botanically minded.



Protection Island, on which the members of the Vancouver Expedition landed in 1792 before charting the Strait of Juan de Fuca. At the right, the corn salad, which Archibald Menzies, surgeon and botanist of the party, said "dazzled our eyes."

First Flower

By H. W. HIGMAN

On may 1, 1792, two officers and the botanist of a British exploring expedition toiled to the top of a small island in the Strait of Juan de Fuca. Spring warmth filled the air; the sun shone brightly. Three well-guarded boats waited at the spit below.

Thirteen months before, a gentle northeast wind had taken these men out of Carrick Roads in England. They had visited Australia and New Zealand. They had traded axes for hogs in Tahiti, and had astonished Sandwich Island natives with a display of fireworks. And now their two ships, *Discovery* and *Chatham,* had passed Cape Flattery and lay at temporary moorings.

Instructions had directed the expedition to acquire "a more complete knowledge" of the northwest coast of America, "and to pay particular attention to the supposed straits of Juan de Fuca." Having arrived, the explorers sought a proper place for refitting. This they hoped to locate from the island summit.

Journal entries show a curious difference in the reactions of the leaders to the events of the day.

Young Peter Puget, second lieutenant on the *Discovery,* displayed his interest in people. He barely mentioned the day's routine, but devoted half of his space to the Indians who brought halibut to the ships. He mistrusted them and thought that they took a friendly attitude only because the ship forces were strong.

Captain George Vancouver, commander of the expedition, carefully recorded the activities of the day, beginning with the arming and provisioning of the small boats, the description of the shore and the distant mountains, the landing on the "enchantingly beautiful" island, and the gathering of roses and gooseberries. Then he described the finding of a suitable refitting harbor. The return to the ship at midnight, and a reference to the visiting Indians, closed the day's entries. He overlooked nothing that might interest the Lords Commissioners of the Admiralty.

Natural science dominated the journal of Archibald Menzies, surgeon and botanist. He wrote of the "vast flights of water fowl such as Auks Divers Ducks & Wild Geese." He attempted to tow a recently-killed animal to the ship for examination, but he abandoned the attempt—"the stink [it was a skunk] it emitted was so intolerable."

He described one island bloom as "a small species of wild Valerian with reddish colored flowers growing behind the beach in large thick patches." He was telling of corn salad, a stiff annual with opposite leaves, and with small rosy flowers in dense clusters. Along the beach the continual wind moves them in odd jumps and nods, which makes them look like little red-headed dancing puppets. Ordinarily they would attract little attention, but to Menzies, just released from a crowded ship, they appeared most attractive. He wrote that they "dazzled our eyes."

Historically, the plant is of great interest, for it is the first one specifically mentioned in America by the expedition.

The exploration proceeded rapidly. Within eight weeks the channels of the entire area had been charted, and the ships had (Continued on page 50)

Coosie enjoys a bit of refreshment in her traveling suitcase. Extensive travel, however, has not made her blasé.

Coosie Was a Stowaway

By EDNA H. EVANS

"CALLO 13 COLLECT—CHICAGO, ILL.
EDNA EVANS
EXCHANGE HOTEL, MIAMI
PERMIT 38540 ISSUED AUTHORIZING YOU IMPORT ONE KINKAJOU. SHOW THIS TO COLLECTOR.
DENMEAD FISH & WILDLIFE SERVICE"

COOSIE was legal at last.

For a three-month-old kinkajou, weighing scarcely a pound, Coosie was about as well documented as any animal immigrant could be. Still, until that final telegram arrived, Coosie was classed as a stowaway aboard a Pan-American clipper. Thus her tenure in this country was definitely precarious.

Importing animals into the United States is not as impossible as some tourists think. Nevertheless, the government rightfully puts certain restrictions on such importations, and bringing back live animals is not as simple as returning home with inanimate souvenirs.

Coosie met the requirements by having, first, an export permit, and, second, a health certificate (in Spanish) issued by the *Ministerio de Agricultura y Cria, Direccion de Ganaderia, Medicatura Veterinaria Regional No. 16,* in her home state of Mérida, Venezuela. This certificate was later approved by the U. S. Health authorities. But without that final "welcome" from the Department of Interior's Fish and Wildlife Service, Coosie could not become a bona fide resident of the States.

A tour of inspection after being placed in her new cage.

We began our association rather unexpectedly when I looked up and saw a young Venezolano standing outside the hotel in Mérida with a kinkajou in his arms. Secretly, I had been hoping all along to find a kinkajou in South America, but Colombia, Ecuador and half of Venezuela were behind me and not a kinkajou had I seen. So, after she chewed on my thumb for a few minutes, and then curled up in my lap for a snooze, I began negotiations to buy her.

Such dealings are approached rather obliquely in Latin America. Ours proceeded with the assistance and interjections of the crowd that soon collected. Interested onlookers included people from the hotel, cruising bootblacks and newsboys, legitimate passersby, and the generally curious individuals who seem to materialize from nowhere whenever an American tourist stops

Oh so comfortable! Coosie poses contentedly in the sleeping box in her new home. She is a most appealing ex-stowaway.

more than twenty seconds at any one place.

"What do you call it?" I began.

"*Mono,*" the owner replied.

"Oh, no, it isn't a monkey," I contradicted. "It isn't even related to the monkey family. In my country it is called a honey bear or kinkajou."

Parenthetically speaking, it is surprising the number of native names that are applied to the kinkajou. In Mexico the animal is known as a *tancho* or a *marta.* Further south it answers to other names—*marteja, zorro del monte, perrito del monte* and *mono de noche.* And, just to make things more complicated, it also shares these names with other unrelated animals. *Marta* may also mean the tree opossum; *marteja,* the marmoset; *mono de noche,* a real night monkey. Scientifically, the kinkajou is known as *Potos flavus,* and is closely related to the coatis, the raccoons, and, more distantly, to the pandas.

With the enthusiastic help of all the onlookers I learned that the local name for the animal was "Cuchi-cuchi," that this particular one was three months old, and that it had been caught up on the high, cold mountain slopes above the town. It ate bananas, bread and milk. Also, there was another larger kinkajou somewhere in town.

Then came the important question, *"Quantos?"*

The answer required considerable thought, so, while the owner meditated, I examined the snoozing kinkajou more closely. She seemed to be in good shape—no sores, teeth good, fur slightly worn under the rope around her neck, but otherwise in good condition.

By this time the owner had decided on his price and I had decided on mine. Eventually, we met halfway between and the deal was closed to the satisfaction of everybody. Coosie was enthusiastically escorted into the hotel patio, given a banana and a saucer of warm milk, and finally established in a big cardboard carton in my room. Latin American hotels are quite broadminded about pets.

And then my troubles began.

Kinkajous are nocturnal animals. Give them a dark place to their liking and they will curl up in neat brown balls and sleep all day. They will play if you wake them, but not enthusiastically. After dark, though, and especially after your bedtime, they are full of fun.

Coosie—her name was coined from a combination of Venezuelan "Cuchi-cuchi," and the Colombian version, "Cusa-cusa"—behaved nicely the first night, was a bit more energetic the second, and during the third night clawed a hole in the bottom of her carton and emerged. The first I knew about that was when she shinned up the leg of my bed and stepped on my face, right in the midst of a very sound sleep.

After that, the nights were something of a problem. We moved on from Mérida the day after her nocturnal Houdini trick, and Coosie traveled in a small suitcase, about fourteen inches long, six inches wide and four inches deep. With holes cut for ventilation, it made an ideal place for her to sleep during the day. At night she was tied to my typewriter case and given a half circle with a radius of about thirty inches to play in. It was necessary to move everything out of her reach. Anything large enough to climb she would have climbed, and probably would have hanged herself in the process. Things small enough she would have knocked over.

By the time we reached Caracas, Coosie was a seasoned traveler, with plenty of energy stored up by day to be worked off at night. First she pulled the typewriter over with a loud thump. Then the patter of her claws on the wood floor (they had not sounded so loud on tile) made a seemingly terrific racket in the nighttime silence. Finally, she sounded off with a throaty, high-pitched kinkajou bark.

Sleepily admitting defeat, I untied the rope and gave her the run of the room. First she climbed up on the bed, walked across my face and began investigating the lamp on the bedside table. The switch was loose, and she soon learned to turn it on and off with her teeth. She flashed out a regular kinkajou dot-and-dash message until I put the lamp in the closet.

Then she tried chewing my toes, sticking a long, tickling tongue between them all. I wrapped them up. She shifted to my ears and chewed on them until I pulled the covers over my head, too. By that time I was wrapped tight as a mummy in the bedclothes.

Coosie was not discouraged. She found a new game. Climbing up on the foot of the bed she launched herself into space, landed on my feet, bounced and made a second landing on my stomach, bounced again and landed on my head. That was great fun, so she scampered back to do it again. And so it went on until the roosters were crowing and Coosie was ready to curl up in her box again. Before the night was over she had climbed everything climbable, investigated everything investigatable, and, during her quieter moments, had allowed me a (Continued on page 52)

BEARS. This relief panel was carved in rock maple. Bears, the author says, are easy to draw—inaccurately. At the left, OWL was carved from mockernut, a heavy wood. In this sculpture the author sought to catch alertness and latent power. PENSIVE PENGUIN, right, is fashioned from a redwood burl. This wood is soft and has a mediocre grain, but the mass of knotty wood is beautiful and takes a high polish, which is not represented in the photograph.

Why a Naturalist Sculpts

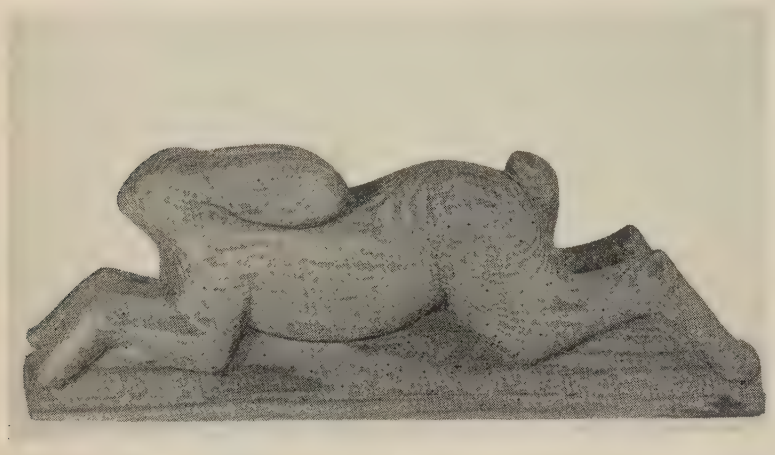
By RAYMOND TIFFT FULLER

PROBABLY no two species—animal or plant—look exactly alike; act precisely alike. Yet all species in a genus or family are similar. The individual species has evolved out of the more generalized genus; the genus out of the more generalized family and so on. Underlying our man-made classifying system of species-genus-family-order, there are, of course, the deeper relations of a living creature's own anatomy, its way-of-living, its characteristic set of embodied functions; and an outer form arising from these. And truly there is a "fish-principle in Nature" (as Thoreau put it); a bat-, a moth-, a bear-, an orchid-principle.

But, can you photograph a principle, or a genus, or a family? No, only a species; a given individual or individuals. A photographer cannot generalize. He must particularize, unless he is expert in manipulating "soft focus" or ultra close-ups on anatomy. In such case the camera occasionally does suggest that characteristic "significant form" in a way closely akin to the artist's.

However, the artist—painter, sculptor, cartoonist—can generalize; can make significant form and dynamic action stand out. Inasmuch as living form is to function as glove is to hand, his work can suggest the innate and characteristic form-function of a living thing far more forcefully than can the photographer. Sculpture and relief carving can powerfully suggest the, or an, *essential* quality in a species: its key-form; its special aspects that suggest action, or temperament, or both. The artist is a creator. He generalizes the particular. A bat has aeons of functioning, of purpose, behind it; a bat is most particularly not like a bird or a mouse. A piece of sculpture can make plain why this is so. A sculptor observes this or that bat-trait or bat-form; tries to "catch it" in wood, clay, or stone. Because such a sculpture pleases him—perhaps after the itch to do it has plagued him a

long time—it is likely to please others. Wherefore, some folks may call the job Art. Painters have always been detecting, then recreating as Art, such abstract qualities in people, or in scenes, as despair, innocence, joy, youth, poverty.



SPEED. The rabbit was carved from Georgia hard pine, the alternate hard and soft grain layers of which make the wood difficult as a working medium. OAK ELF, right, is fashioned from white oak, the best carving oak. This piece is made from a crotch section, which, as potential firewood, suggested squirrel to the sculptor.

At this point if you were to break in and ask why I started—five years ago and at 40-odd—fashioning wood this way, I would have to reply: "Oh, ah, well, I, uh, I just sort of thought I'd *like* to. I guess I couldn't help it."

I had wanted to point out something, I suppose. I had never taken any instructions in sculpture, although I do own capable hands. As a lifelong naturalist I had formed habits of quick identification; of seeing wildlife analytically, as it were, delighting to recognize those little mannerisms which, in total, go to make up differing personalities. One day I found myself in a neighbor's woodshed holding a cut-off chunk from a three by five Georgia pine stringer, and had begun to turn over the idea in my mind: "Now I'd like to make a running rabbit out of that. I bet I could, if I took plenty and plenty of time at it."

Eventually I did. It is shown here. That rabbit started me going, as I have started countless wild bunnies on the run. From that one puttering beginning—from that foundation of *confidence*—I have gone on during each winter since. I understand clearly that I am only *learning*, learning a great deal with each piece I tackle and turn out. In fact, the learning, both technical and esthetic, is more exciting than any tangible success or near-success in my efforts. I have now two dozen finished items.

Pieces fit to carve were scarce. I naturally put a lot of thought and study into woods. The exquisite aptness of the grain in this first piece stirred me as I went along bringing it out. This plain, simple wood itself was beautiful! Its beauty grew. Nearly every time my tools turned a bulge, or worked-out a hollow, those broad stripes of grain obligingly curved and bent to lend emphasis to the sculptured feature—a most fascinating process.

It became apparent, almost from the beginning on that piece of dirty timber, that what I was actually trying to do was *not* to carve a running rabbit at all. I was seeking to exhibit speed in a living form that Nature had built especially for speed. Not knowing it then, I was trying to do what any self-confident artist would do in any medium—catch, exhibit, emphasize an innate quality, an essence. I was about to communicate to my friends an emotional stir that rabbit-form gives me. I felt sure I ought *not* to be doing so as biologist, scientist, professor or photographer; that exactness in anatomic detail did not matter too much.

LIQUID LIFE. This is the title the author-sculptor gives to this carving of porpoise. It was cut from a century-old barn timber. The sculptor considers this his most "alive" piece to date.

I believe that the full beauty of woods is not appreciated, or their innate character understood except by those who actually work (Continued on page 52)

These three pictures graphically show the variations in form of insect galls. Some of these formations look like fruits or other natural growths on a plant. At the left is the pine cone gall growing on willow, where it is by many mistaken for a flower. In the center are spiny rose galls, certainly no part of a normal rose bush and therefore mystifying to the casual and uninformed observer. At the right is a close-up of the pine cone oak gall, another strange formation made by one of the gall insects. At the bottom of the page, again in contrast with the galls above, is the oak hedgehog gall on white oak. These look like tiny hedgehogs or woolly bear caterpillars and are made by a cynipid fly.

Insect Galls

Photographs by Lilo Hess from Three Lions

IN WOODS and fields, one comes upon peculiar swellings on leaves or branches, flowers and roots which, while they do not appear to be an integral part of the plant itself, are firmly attached. These vary greatly in color and size, and are of almost every conceivable shape—round, flat, conical, square; they may be hairy, woolly, downy, or spiny; wrinkled, smooth, or softly curved. Some are very fragile and others are so tough as to require a sharp blade to cut through. Some are so small that they are hardly visible, while others reach the size of an apple. All these strange structures are produced by small insects, and are called galls, of which there are about 15,000 different known types. Some trees seem to attract the gall-forming insects more than others; the oaks, for example, drawing as many as 445 different kinds of gall insects.

The interior of different types of galls are as varied as their outer forms. Some are woody, some spongy, some pulpy, and still others fibrous. When one of the commonest oak galls is cut open it will be found to consist of a soft woolly substance, in the center of which is a small compartment of a hardy woody nature. Inside this cell lives a small, plump, milky-white grub, the larva for whose benefit the gall is formed. When the larva hatches from the egg, it finds itself surrounded by a juicy meal, and since eating is its only occupation, it grows rapidly. There is no opening through which air can reach the enclosed larva; therefore it must be able to exist with the minimum of air that can pass through the tiny pores of the plant substance.

When the grub is fully grown, it changes to a pupa and after a while the adult emerges. Some grubs leave their gall-homes while still in the larval stage and burrow into the earth to complete their transformation. There are different kinds of gall-forming insects—flies, beetles, wasps, moths, midges, plant lice and mites, these last very small and not strictly insects.

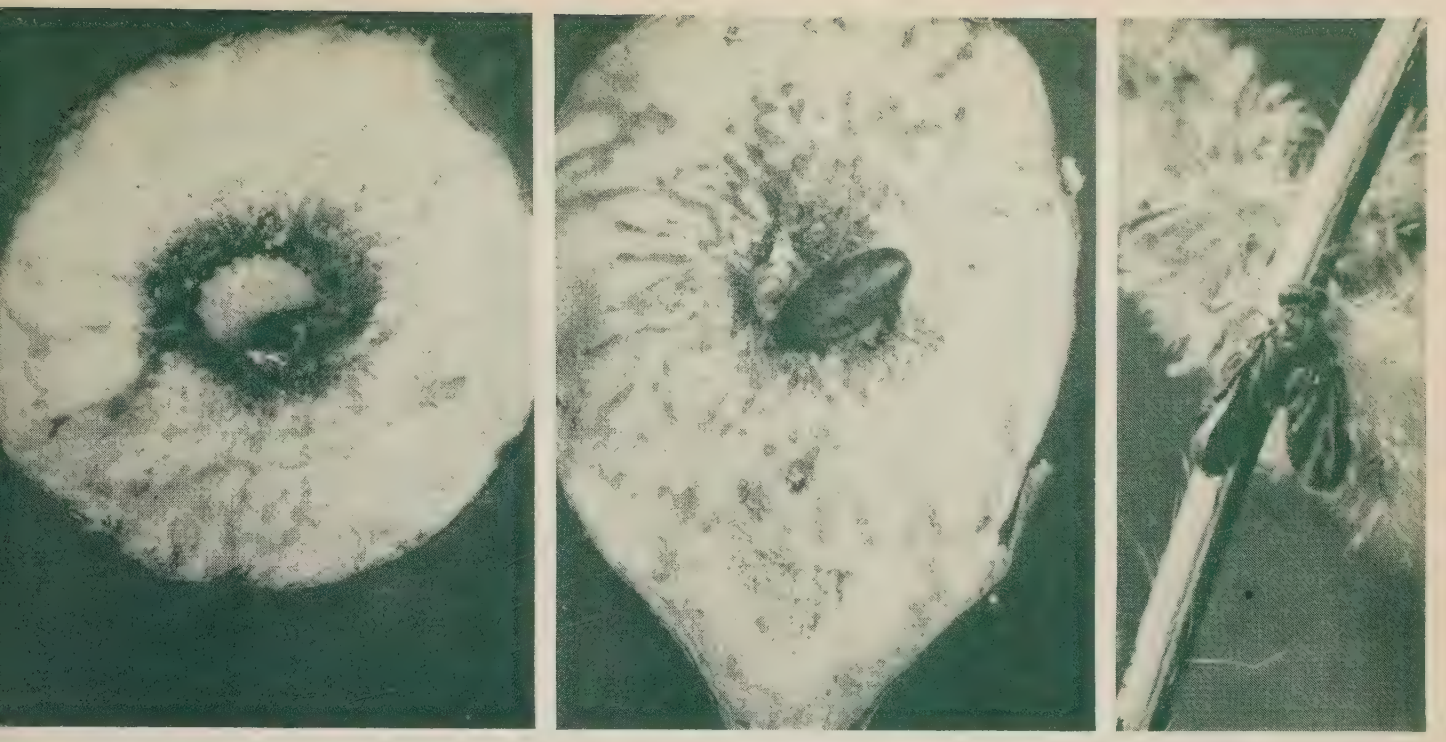
Although the exact cause and method of growth of galls remains obscure, this has not prevented man from putting certain kinds to constructive uses, and making them work for him commercially. Since the cells are rich in tannic acid, certain galls are used considerably for tan-

The rose root gall at the left, above, is more obviously a strange and alien growth on the rose plant than are some of the other galls. The witch hazel cone galls, center, above, are made by an aphid and look like odd little caps, while the fig galls, upper right, are found on white oak and the reason for their popular name is obvious. At the left is a fuzzy formation known as the knotty rose gall and, below, the oak spangle gall, made by a midge. At the right is an oak gall that is quite commonly seen and, below, a close-up of the same oak gall.

ning, in black, brown or gray coloring, of woollens and hides, as well as for manufacturing inks, and especially those of a permanent nature. Most of the commercial uses are still confined to the Eastern Hemisphere. There are many American galls rich in tannin, and it is probable that they could be utilized here were it not for the high cost of labor. In ancient times a gall produced by a species of *Cynips* was used by the Greeks as lamp fuel.

Certain galls have long been gathered as food for domestic animals in parts of Europe, and even in Arkansas and Missouri. Galls have also been used in medicine; thus certain hairy galls, called rose sponges or bedeguars, were long supposed to be beneficial in cases of sleeplessness, scurvy, and other disorders.

Gall-making insects have often proved to be exceedingly injurious, although not always because of the gall-making habit. Such seems to be the case with the Hessian fly.



Above we take a peek into the interior of a goldenrod gall to discover the grub, then the chrysalis and, finally, the insect that emerges and goes on to lay its eggs and make more galls. At the bottom of the page are two different kinds of goldenrod galls. In the picture at the lower left the galls seem a part of the plant itself. A close-up of this gall is shown at the center, and, at the right, is a contrast in the goldenrod bunch gall.

Some other gall-making insects, however, especially those that prefer to fix their galls on the flowers or unopened buds of important crops, are serious economic pests.

All galls play an important part in the reproductive habits of the insects that cause them. In some cases, parthenogenetic female forms that have resulted from eggs wintering in galls, have even been supposed to represent new species, and have been described as such. Insects parasitic within the abodes of their hosts, called inquilines, are also found in many galls.

Interesting features of the lore of galls and their makers are data on the groups of insects concerned, and the plants selected as hosts. Felt (*Plant Galls and Gall Makers*, Comstock Pub. Co., Ithaca, N. Y., 1940), states that of the 2000 species of American galls, about 800 are produced by gall wasps, Cynipidae, and nearly 700 by gall midges, Itonidae. Other groups concerned are four-winged flies, mostly saw flies, joint worms, certain two-winged flies, a few beetles and moths, and about 80 aphids, or the related jumping plant lice. About 181 are the product of the microscopic plant mites.

Gall wasps attack only six botanical families, and less than 20 plant genera. However, about 750 choose the beech family, mainly oaks.

As an indication of the number of species in a single state, it is of interest to learn that more than a hundred species of gall wasps are listed as infesting various species of oaks in New York. (*A List of the Insects of New York*, M. D. Leonard, Editor, Ithaca, 1928). Those interested in further study of insect galls will also find valuable *Key to American Insect Galls*, by E. P. Felt, published as Number 200 in the New York State Museum Series, August, 1917.

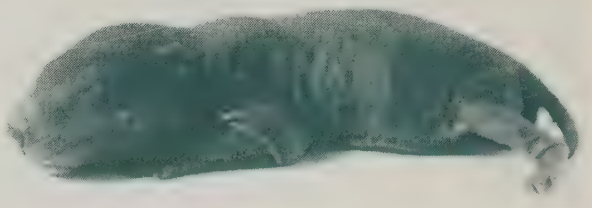
The yellow-crowned night heron, shown here in a fine photograph by Ralph E. Lawrence, is strictly confined to America. It was first described by Linnaeus, and was well known to our early ornithologists. In the Americas it nests from Kansas, Indiana, Illinois and South Carolina, south to Brazil and Peru, in warm temperate and tropical sections. Like many herons, it wanders northward after the breeding season, and then may occur as far north as Maine, Nova Scotia and Ontario. It winters from Lower California, southern Texas and southern Florida southward. In full breeding plumage this is a handsome bird. Its general color is light bluish-gray; the crested crown, and a patch on each cheek, are white; lower parts gray; legs and feet yellow. The young are grayish-brown with numerous whitish streaks and spots. This bird nests in trees and bushes in swamps. Eggs are two to six, greenish-blue to yellowish-g een. Each parent assists in incubation and two broods are usually raised.

It is early March when the woodchuck awakens from its sleep and leaves its winter den. The males appear first and wander far and wide in search of a mate. It may be a few days, or it may be several weeks before the male finds the lady of his choice. When the mate is found the pair live together, for a time at least, in the den the female occupied during the winter.

The Woodchuck

By W. J. SCHOONMAKER

The nursery of the woodchuck is a brood chamber located several feet under ground. It is about fourteen inches high and sixteen inches wide and the brood nest is composed of dried grass. This nursery is similar in all respects to the nest of the adults. The newly-born woodchuck is blind and hairless. Its pink skin is wrinkled and it measures about four inches in length. A litter may vary in number of members from two to five. When about two weeks old the young are nearly six inches long. The snout is gray, while the rest of the body is covered with short, dark brown hair. At this age the infants are still blind.



When the chucklings, above, left, are twenty-eight days old their eyes open, and when about six weeks old they are fully furred and come out of the home den for the first time. Then follow days of learning. The mother teaches the youngsters to seek the safely of the den and always to test the breeze and scan the fields for possible foes before leaving the burrow. Lower, left, are twins of the clover field. The young grow rapidly, and soon the home den is crowded. At the top of the page, right, a woodchuck emerges warily from its den. Showing only the top of its head, it scans the field and tests the breeze. If all is well it comes out a little further and again looks carefully about for signs of possible danger. Finally it sits erect, tests the wind, and then, if no danger threatens, goes forth to eat.

FEBRUARY second has been dedicated to the woodchuck and is known the country over as "Groundhog Day." On this date the woodchuck is supposed to come forth. If it sees its shadow it retires for another six weeks and winter continues. If no shadow is seen, however, the animal remains out and an early spring is assured. Thus the superstition goes.

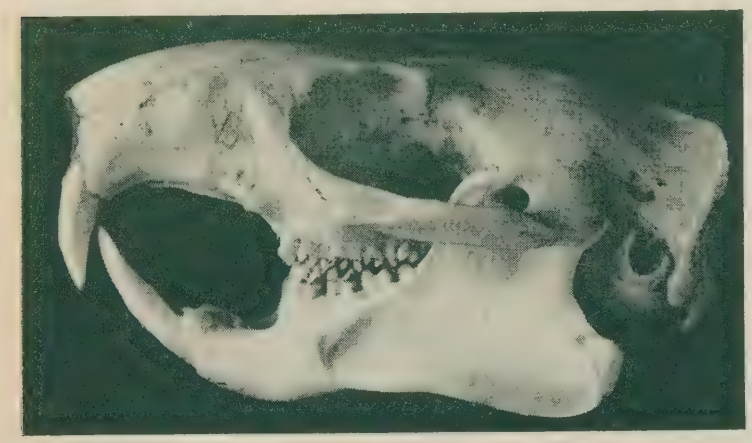
This notion has no real foundation, of course, and when the groundhog is supposed to be announcing future weather conditions, it is usually sleeping soundly in its underground den, far beyond the reach

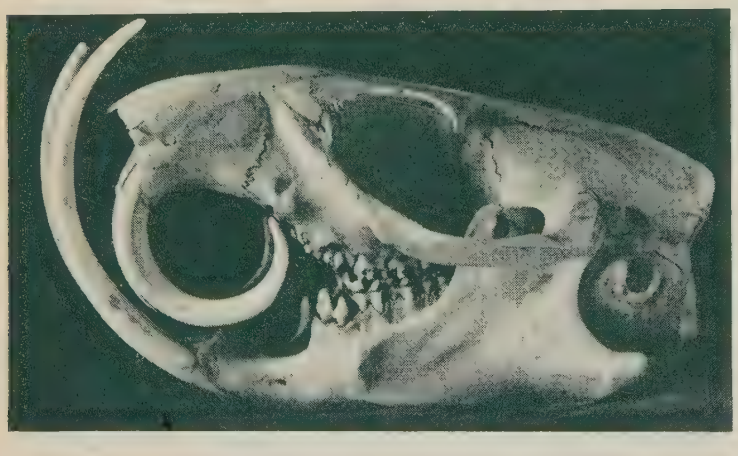
Woodchucks perform a service for other animals, their abandoned dens serving as homes for skunk, red fox and cottontail rabbit. Some of these animals destroy insects and field mice, so the woodchuck is indirectly proving of service to man. And it should never be forgotten that the woodchuck, and all other animals, are important in the great scheme of Nature.

of the farmer because they eat field mice, grasshoppers, beetles and other creatures that destroy farm crops. The woodchuck, in aiding these animals, indirectly helps the farmer. Besides, it is often eaten by the fox and wildcat, and in the West by the coyote.

The woodchuck also aids in improving soil by digging burrows and bringing the subsoil to the surface. This subsoil, when weathered, becomes rich topsoil that is so valuable for crop growing. The weight of the subsoil exposed during the digging of a den averages seven hundred and sixteen pounds.

Finally, the woodchuck appeals to those who appreciate the sight of a wild, free animal in its natural habitat. Its life history and habits are very interesting, and it is a worthy subject for study, as well as a challenge for the Nature photographer.





Failure to detect the presence of a hunter may lead to the death of the defenseless and harmless woodchuck. Many are killed, like the one at the top, above, for no other reason that they happen to provide a living target for a gunner. A poorly-placed shot may shatter the animal's body, leaving the agonized creature to crawl toward its den until the last bit of its strength is gone. This, to some, comes under the head of sport. The two woodchuck skulls above show normal and abnormal growth of the incisor teeth. These teeth grow continuously and are kept in proper condition by grinding against each other. When they fail to meet, both upper and lower teeth grow long and curved, and may even pierce the skull. At the right, above, is a typical woodchuck, grizzly-gray in color, with a reddish belly and black feet and tail. The adults of our eastern species are about twenty-six inches from the nose to the end of the tail. They weigh about seven pounds in early April and nine to eleven pounds in late September. At the right is an albino woodchuck, which are rather rare, although the black or melanistic phase is relatively common.

of the frost. It does not matter to this sunshine-loving rodent, when February arrives in the northern states, whether the sun shines or blizzards rage.

When the animal does emerge from its long winter sleep, it is blessed by few and damned by many. Yet it is a valuable animal and very important in the great scheme of Nature. The burrows that it digs provide homes for the skunk, red fox and cottontail and refuge for the raccoon. The fox and skunk are friends

The Forest Congress

Sponsored by the American Forestry Association, an American Forest Congress met in Washington, D. C., from October 9 to 11. It was called to consider and take action on a forestry program and policy for the United States. The meeting was attended by representatives of a wide variety of interests in the fields of forestry and forest use.

As a basis for consideration, the Forest Congress had before it a program drafted by an able and relatively representative group at a five-day session held at Higgins Lake, Michigan, from July 14 to 18. As a background for both the Higgins Lake group and the Congress was the report of the American Forestry Association's Forest Resource Appraisal. This was a stock-taking of our timber resources—what they are, where they are, who owns them, and what is happening to them. To the consternation of many conservationists, this report also included special pleadings of those who would further exploit our forest resources and break down the present national system.

Any attempt to report in detail on the multitude of papers presented to the meeting would be consumptive of space all out of proportion to the separate significance of these papers. These will be published in the proceedings of the Congress. However, the Congress did reveal the nature and identity of contending forces and viewpoints that seek to control the manner in which our forest resources are to be used in the future. A brief objective analysis of these factors would, therefore, seem to be in order.

It seemed to be conclusively established that there is a tremendous immediate and prospective demand for forest timber; that most of it is still being wastefully harvested; that a great deal of land not suited for anything but forests is unproductive; that the larger portion of forest land is still being cut without any regard for modern forestry practices of sustained yield; that protection from fire, insects and disease is still widely inadequate.

Faced with these and other alarming facts, the United States Forest Service has urged regulation of timber cutting by Federal law and on a national basis, to the end that forested areas may yield a continuing supply of timber. In this the Congress of Industrial Organizations, ably represented at the meeting, concurs. Labor, it appears, sees, in such national regulation, assurance of a stable industry whose workers can hope to settle in wood-producing areas that are maintained on a perpetual basis.

Arrayed solidly against Federal regulation, of course, was the lumbering industry. Its spokesmen, and they were many, argued vigorously for regulation, if any, on a State level. With this view the State foresters agreed. It seems plain, however, that the industry's actual but not avowed enthusiasm for State control arises from realization that State administrations would be easier to control or influence than would the Federal service. Furthermore, a wide variety of State control standards might be calculated to beget a confusion that would defeat the purpose of any control.

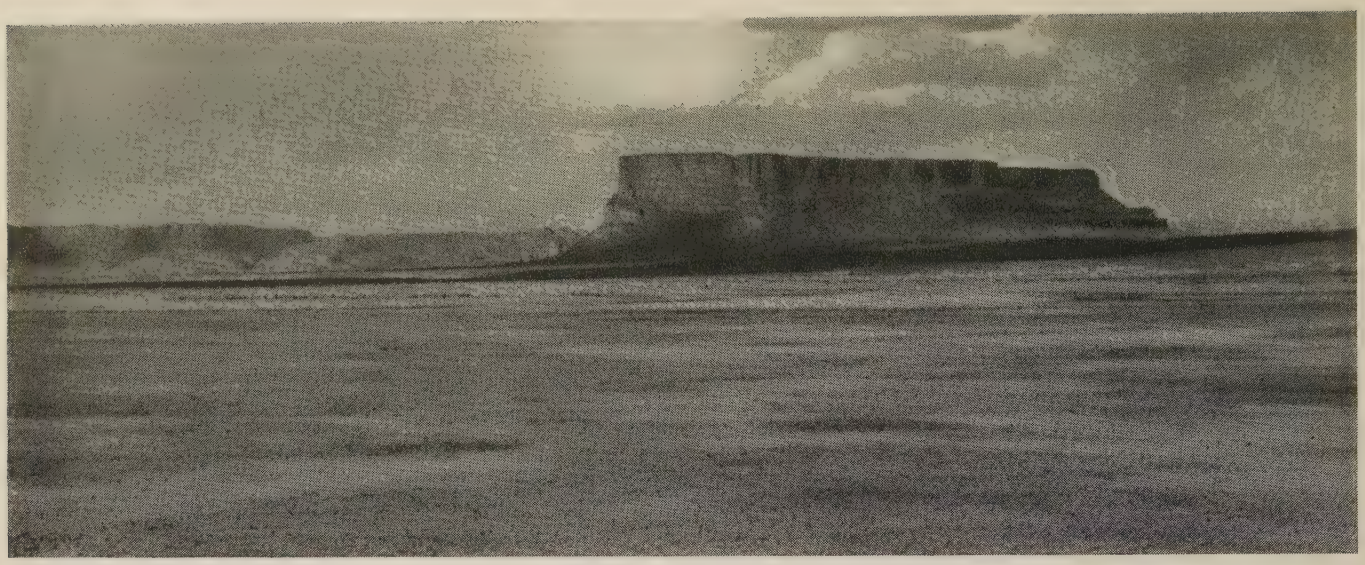
Closely related to the regulation issue was the attitude that developed with respect to our system of National Forests. Not only were the representatives of industry actively opposed to extension of national forest ownership, but they went so far as to urge a policy of limiting Federal holdings to a custodial basis. Under this philosophy the Forest Service would protect and build up a forest resource, at public expense, and then turn it over to the industry for harvesting.

A good many garlands were tossed by the lumber industry in the direction of the widely publicized "tree farms." An idea of excellent publicity value, this planting program has been magnified out of all proportion to its actual importance in restoring forest-producing areas. The "farmed" acreage is pitifully minute compared to the idle and cutover acreage that should be supporting trees, and the use of this program to convince the public that all is serene is specious.

Much credit must be given to the American Forestry Association for the freedom given to the expression of all viewpoints. The basic proposals before the Congress, for example, ignored almost completely the recreational, wilderness and wildlife values of the forest. Individuals and organizations concerned with these considerations were given full hearing.

Although action by vote apparently was originally planned as a means of arriving at a program, this would manifestly have been difficult. The vote of an individual delegate would have had as much weight as that of the representative of the National Lumber Manufacturer's Association, the Chief of the Forest Service or the President of the Association of State Foresters. It was, therefore, decided that the whole problem be referred to the Board of Directors of the American Forestry Association.

This Board now has before it the Forest Resources Appraisal, the Higgins Lake proposals and the addresses and discussions of the Forestry Congress. It also has a grave responsibility. It must deliberate upon, and eventually propose, a forestry program that is designed to be in the best interests of the future of our entire country—a program that is not subservient to the interests of industry, labor, or forest administrator. This is a difficult task, requiring courage and vision. If we may judge by the conservation tradition of the American Forestry Association, such courage and vision will not be lacking.



Steamboat Rock stands as a guarding sentinel in the north end of the upper coulee. Some geologists are of the opinion that the right hand channel was cut as a relief channel when the glacier filled and blocked that on the left. When the upper coulee is again filled with water, as a balancing reservoir for the irrigation system, Steamboat Rock will almost become an island. Only a narrow neck of land on the right will connect it with the mainland.

The Grand Coulee of Washington

By CLIFFORD R. KOESTER

Photographs from U. S. Bureau of Reclamation

"THIS IS the deathbed on which Pluvius writhed and agonized in the last throes of desolation, before departing this vale of tears that now lies there so placidly in the Chalice of the Gods at your feet." Thus, with a majestic sweep of his arm to the eastward, the caretaker of Dry Falls State Park in central Washington introduced one of the most spectacular geological phenomena in the Pacific Northwest—indeed, in the country—the Grand Coulee.

The word "coulee" is taken from the French *couler*, to flow. To understand what one is gazing upon it is necessary to retrace the history of this region several millions of years, back to the Age of Reptiles and the first flowering plants. In this Cretaceous period a great inland sea occupied the vast Cordelleric trough extending from the Cascade highlands almost to the

This is a view of the upper coulee, looking north from the west wall, Steamboat Rock in the distance. Traveling toward the coulee across the rolling hills and scablands on either side one sees a low line of clifflike rocks rising in the distance. Continuing on toward the distant cliffs the ground suddenly falls away beneath your very feet. So suddenly does one come upon the coulee that it is a moment or two before you realize that you were looking across the empty space of the chasm to the distant wall. Early settlers feared wandering over the walls at night.

Mississippi River, and stretching from central Mexico to northern Alaska.

With Miocene times came a period of intense folding and crustal warpings. The sea was slowly pushed from its bed, and the Rocky Mountains equally slowly rose in its place, while the Cascade Range continued to be elevated. Extensive volcanic activity developed, and out of the thousands of fissures poured immense lava flows. Flood upon flood of molten lava flowed across the land. Two hundred and fifty thousand square miles of eastern Washington, northern Oregon, and northwestern Idaho were inundated in these fiery floods. The flow crept up the slopes of mountain ranges, reaching all but the highest peaks. Lakes were formed as the lava cooled, and mighty rivers caused to change their courses.

Thus the Columbia Lava Plateau was built to a height of more than 4000 feet in many places. There is no evidence on the face of the earth today, with the possible exception of that in India, of a greater lava flow having ever occurred. At least seven successive lava-floods welled up from within the earth, each separated by long intervals of time. During these intervals the lava cooled and weathered into soil, and plant life crept down from the highlands to flourish in semi-tropical jungle, only to be destroyed by a succeeding flood.

The Columbia River, flowing southward through the Colville Valley toward the Columbia Gap in the Cascades, was forced out of its course. Each succeeding lava flow deflected it farther to the north and west, until it came to rest on the border line between the new lava plateau and the older granite of the Okanogan Highlands and the Cascade Mountains. Here it cut a gorge 1600 feet deep through solid rock —granite on one side and black basalt on the other. This is now known as the Big Bend of the Columbia.

There followed a period of quiet erosion. Near the close of Pliocene time the Cascade Mountains were warped into their final position, and changes took place in the lava plateau. The western edge was elevated several thousand feet, and the southern area depressed a thousand feet or more, producing a gradual slope to the southward of twenty to thirty feet per mile. Local movements gave birth to several prominent ridges and structural basins within the lava plateau itself.

Time moved slowly as the world entered its last glacial climate. Steadily the great polar ice cap of the Pleistocene era pushed down from the north to bury more than four million square miles of North America beneath a crushing burden of ice four to six thousand feet thick. For more than a million years it held the land in its icy grip.

Twice, at least, long arms of the Cordelleran Ice Sheet pushed down the Okanogan Valley and across the Columbia River Gorge, blocking the canyon to form a great lake extending back toward the headwaters of the stream. This ice dam occurred only a few miles downstream from where the massive Grand Coulee Dam now blocks the channel of the Columbia. The Spokane Lobe of the ice sheet extended into the Spokane Valley closing the Spokane River, and also the Columbia above its junction with the Spokane. Ice did not occupy the gorge of the Columbia between the mouth of the Spokane River and the Okanogan Valley.

It was into this open canyon the turbid, glacial waters dumped their tremendous load of silt, sand, and gravel. Terraces remaining on the canyon walls attest to the enormous volume of material carried into the canyon. The sand and gravel used in the concrete for Grand Coulee Dam came from such a terrace deposited nearly a thousand feet above the river. The yellow flood from the ever-advancing glaciers soon filled the canyon to overflowing. These ever-

The Dry Falls of the coulee have been described as the most remarkable geological phenomena on earth. Here are shown two of the huge alcoves on the western edge of the scarp. The rest of the falls is in the distance off to the right. This falls was two and a half times as high and five times as wide as Niagara. It is higher than and three times as wide as the greatest existing cataract, Victoria Falls, in Africa.

Whatever desire one may have for that which is grand in Nature is amply filled in the Grand Coulee. Here is forever inscribed the record and labor of primeval ages of fire, frost, and flood. This aerial view of the upper end on the coulee, taken during the construction of Grand Coulee Dam, shows how the retreating waterfall made junction with the Columbia River Gorge, which was blocked by the Ice Sheet a short distance downstream from where the dam rests. Steamboat Rock can be seen in the distance. The hummocks seen in the coulee this side of Steamboat Rock are granite outcroppings, the peaks of old mountains once buried beneath the lava flows, but which were eroded bare and smooth by the glacial floods.

increasing floods spilled over the canyon walls and roared away to the southward across the Columbia Plateau.

This torrent of abrasive, turbid glacial water on a gradient of twenty to thirty feet per mile was an implement of tremendous eroding power. About twenty-five miles south of the river the lava beds dipped sharply downward, about 800 feet in a mile, to the level of the Hartline Basin. The water, roaring down this slope, developed rapids that soon grew into a stupendous waterfall. After cutting a short distance back toward the river it became a cataract two miles wide and 800 feet in height, with the volume of a hundred Niagaras.

This waterfall existed long enough for it to cut its way back some twenty-five miles to the Columbia River, leaving a canyon one and one-half to five miles wide with perpendicular walls towering nearly a thousand feet high. This left the north entrance of the Grand Coulee a hanging valley 550 feet above the old river channel. About eight miles before reaching the river the fall widened to more than four miles, and divided around a great island to form twin cataracts 800 feet high with a combined width of nearly five miles. This island is the outstanding landmark of the upper coulee, two miles long and three-quarters of a mile wide, standing in midchannel of the coulee. To the nautical eye its layers of basalt suggest the decks

The chain of lakes in the lower coulee constitute a recreational area of great value to the people of central Washington. This is a view of Park Lake, with part of Dry Falls showing in the far distance. These beautiful, fresh-water lakes are set in a region of dramatic relief. The walls of the canyon are brilliantly colored in shades of black and red, splashed with the vivid yellow and green of moss and shrubbery. The clear, deep lakes of intense blue offer excellent bathing and boating, with good fishing in the deeper parts. This region has been recently acquired by the state of Washington for a state park. A big lodge and resort is soon to be built on the slope across the lake, and a dude ranch will be located in the canyon off to the right.

and turrets of a mighty battleship, hence the name of Steamboat Rock. When the headward erosion of the coulee made junction with the Columbia Gorge, it then tapped the reservoir in the original river canyon, lowering its water level, and concentrating in the Grand Coulee the entire stupendous flow from the Spokane and Okanogan ice lobes to form the greatest river of which any evidence remains upon the earth.

The down-cutting of the Grand Coulee involved an enormous excavation of glacial till and ground up basalt. From the upper coulee about twenty cubic miles of material was removed, and at least a similar amount from the lower coulee. A small part of this was to be left in the Hartline Basin, and at least twenty-five cubic miles of material was dropped in the Quincy Basin, with the balance probably being carried onward to the sea.

Great earthen dams are now being thrown across both ends of this immense trough to form a balancing reservoir, into which huge pumps will lift water from the Columbia River. At the lower end it will be led into a large canal to irrigate more than a million acres of the Columbia Basin in central Washington. Thus man will reenact one of the greatest dramas of history, and once again the glacial waters of the Columbia will pass through the Grand Coulee, fed not from the great Ice Cap but from giant pumps at Grand Coulee Dam.

Water pouring out of the upper coulee found the outlet of the Hartline Basin too small to carry the immense volume. It flooded back into the basin to form a lake covering more than fifty square miles. Here the water dropped its load of silt and gravel to fill the basin to a depth of several hundred feet. This lake lasted until the floods had widened and deepened the outlet channels sufficiently to carry off the floodwaters of the summer season.

Spreading out over a rocky fold, some twelve to thirteen miles wide, these tremendous floods rushed down the south slope of the anticline to form rapids and waterfalls that carved out some of the most weird and spectacular of all the abandoned channels of this prehistoric river. Gravel bars show that currents were reversed in many of the side canyons, and that erosion of the lower coulee, and the scablands to the east of it, was the result of a complex series of events covering a long period of time. One of these channels was to become part of the lower coulee. Here a waterfall, 400 feet high and two miles wide, originated. Retreating northeastward from Soap Lake, the fall cut a seventeen-mile box canyon along the coulee monocline, leaving on the west side walls more than 1200 feet high. In this lower coulee four beautiful lakes now nestle in the old channel.

This lower coulee opened the way for the floods to enter the Quincy Basin. Here a lake covering 250 square miles was formed. In it sand, gravel, and silt were deposited to a depth of 500 feet. This lake existed until channels were eroded below the level of the lake-bed to the south and west, thus allowing the waters to flow into the lower Columbia River Gorge.

Dry Falls is by far the most spectacular feature of this once mighty water course. Visitors usually see but little of the five-mile brink of this ancient cataract. Its broken escarpment shrinks to a hazy outline on the distant horizon. Only two of the great alcoves, with small lakes nestling at their feet, are visible from the park vista house on the highway. Huge potholes in the coulee floor testify to the terrific force and eroding power of this swollen glacial flood as it poured over this precipice with great thunder and roar. Today it is silent. But even now one is awed by the vastness of the canyon and its frowning escarpment rising tier upon tier from the coulee floor.

At last the climate grew warmer, and as the ice sheet retreated northward the floods subsided. The ice dams were removed, and the Columbia assumed its old channel to the sea. The climate had become arid from the recent elevating of the Cascade Mountains, cutting off the western winds, and, as the centuries passed, little occurred to change the appearance of the plateau.

Then again the ice sheet advanced. This Wisconsin Ice pushed down to block again the Columbia Gorge, and once more glacial floods roared through the Grand Coulee. The ice advanced across the Waterville Plateau as far south as Dry Falls, and forced its way into the Grand Coulee as far as Steamboat Rock, causing the river to flow through the eastern channel. The water then raced and tumbled through a gorge with sheer cliffs of basalt on the east and a towering wall of ice on the west. This period did not last as long as the previous one, nor were the floods nearly as great. The coulee was eroded more deeply, and Dry Falls retreated some three miles more to its present position. Great blocks of ice broke loose from the glaciers and ice bank to float as bergs down the channel, littering the coulee floor with huge boulders and debris. Smaller ones passed on to plunge over Dry Falls and finally to dot the quiet surface of the lake in Quincy Basin.

The walls of the coulee reveal geological changes of the past that tax the most vivid imagination to reconstruct. Often the soil deposit between the layers of lava has been baked into a rock-like mass, but in it can be found tree casts of great size. Fossil beds in the silt and clay deposits of old lake bottoms contain fine remains of Miocene flora. Many varieties of oak, elm, cypress, gum and coniferous trees have been found. Elsewhere in the lava plateau have been uncovered remains of the fig tree and the ginkgo, which is now native only in the far East.

Specimens of wood were found so perfectly preserved that they burned quite readily, giving off the odor of sandalwood. The curvature of the pieces indicated the original trees to have been six to eight feet in diameter, and exceptionally close-grained, showing a growth of twenty years (Continued on page 48)

George Rex Green

By HAZEL E. SMITH

FEW MEN have contributed more to the field of Nature education than George Rex Green. Few have shown a greater admiration for the many forces of Nature, or possessed a more thorough understanding of the magnitude of the realm of Nature's subjects. Through his guidance, during a lifetime of unselfish service, thousands of students have received inspiration and encouragement from this leader.

Reared on a farm in the mountains of central Pennsylvania, George Green found stimulus for his love of Nature at an early age. As a child, he was taught to enjoy the various forms of wildlife surrounding him. He learned that wild things thrive best in their native haunts. He would travel far to seek the habitat of an elusive honey bee, or climb high to restore a downy gray owlet to its nest.

Walking eight miles each day through field and forest, George Green taught one term in a one-room country school. One day, on this walk, he came upon a small cub standing rather unsteadily on a fallen tree trunk. Thinking to attract the attention of the little fellow, he threw a small stone at him. Suddenly, much perturbed, mamma bear emerged from the bushes, another cub following close on her heels. George made for what he optimistically thought was the nearest shelter—a beech tree—and climbed up. Fortunately, mamma gave him only one look; then walked nonchalantly away with her children.

Later Professor Green attended Dickinson College, and received his Bachelor of Arts degree from the University of Michigan, his Master of Science degree from Pennsylvania State College, and did graduate work at Cornell and the University of Pennsylvania.

For thirty-three years, Professor Green's name held a prominent place on the roster of the Pennsylvania State College faculty. To his associates, he was known as a great naturalist and indefatigable worker, a man of impeccable character. To his students, he was teacher, counselor, friend. Serving in several forestry chairs, he became head of the department of Nature Study in the School of Education when it was established at the College in 1924.

In 1913, Edith Newton became a life partner in the Green "firm," and, later, two junior partners, George Rex and Betty Irene, joined the "firm."

Professor Green likes to recall a memorable occasion, when the world famous pianist, Madame Samaroff, visited the Pennsylvania State College. After a recital, a reception was held at the University Club rooms, with Professor Green as chairman of the entertainment committee. In the afternoon several students had gone with him to the woods, and cut huge basketsful of trailing arbutus, being careful lest they molest the roots.

At the reception, Madame Samaroff was presented with a large corsage made of the delicate, fragrant flowers, and each guest in the receiving line was given a smaller one. Expressing her appreciation, the pianist said: "Friends, I have traveled in many countries, played for kings and queens, but never have

An historic picture taken at the first session of Professor Green's Nature camp. In the center of the front row sits beloved Anna Botsford Comstock, mother of American Nature study, who helped Dr. Green launch the project.

A scene on Ross Run near the State College Nature camp, the laboratory of which was the outdoors.

I received a warmer welcome; never have I seen anything lovelier than these exquisite little wild flowers."

An outstanding contribution to the field of Nature education was made in 1925, when Professor Green established a Nature camp. The site was approximately twenty miles from the Pennsylvania State College campus. The camp grew to accommodate sixty students, holding two summer sessions of three weeks each, and offering six hours' credit each session.

Cooperating with Professor Green in the establishment of the Nature camp was Anna Botsford Comstock, widely known as the mother of American Nature study. Other noted naturalists visited the camp as lecturers and field trip leaders. The regular staff of naturalists was headed by Professor Green. In 1941 the camp was closed and has never reopened. The loss to Pennsylvanians, and to the field of Nature education in general, has been an enormous one.

Professor Green served as wood technologist with the Naval Air Craft Factory at Philadelphia during World War I. He has contributed numerous articles on Nature study to professional magazines, and has written three books, *The Conifers* and *The Broad Leaves* in the "Trees of North America Series," and *Survey of Nature*. He served as president of the American Nature Study Society from 1925-1927, and is a member of many scientific societies.

When asked to point out some significant facts discovered in his work, Professor Green replied that "science teaching should be alive, not dead; Nature should be taught, as far as possible, in living, natural form."

Professor Green's lectures on snakes were enthusiastically received wherever he traveled, for he had made an extensive study of these reptiles. One evening, before a lecture in Pittsburgh, he registered at the Fort Pitt Hotel, sent his suitcases to his room, and went out to dinner. One of the suitcases contained a number of both deadly and nonpoisonous snakes. The house detective, fond of a joke, and collaborating with the manager and photographers, summoned the servants on the floor to the Professor's room, promising them a special treat. When the lecturer reached his room, he found a strange and hilarious group gathered about the suitcase containing the excited, crawling snakes. On top of the dresser was a badly frightened and screaming maid.

Bear Meadows, a wild and swampy area south of State College, has long been a favorite rendezvous for Nature lovers. It is a paradise for birds, a haven for wild animals, and, yearly, provides rare and unusual specimens of plant life. In Bear Meadow, Professor Green and a group of Nature students found twayblade orchid and the pitcher plant.

It was not uncommon for students to gather on the lawn of the Greens' lovely home, after a long field trip, and enjoy a steak fry, or corn roast. For Professor Green was ever a friend of *his* boys and girls, and nothing was too much trouble or too good for them.

On August 20, 1945, Professor Green, because of failing health, was retired from active duty at the College. But, for this great naturalist, retirement has not meant cessation of work. In a recent letter he wrote: "I have received much out of a life of service to students. I received more than the students, but I have less leisure time now than when I worked at the College."

Innumerable are the hours he has spent gratuitously. Immeasurable, indeed, the influence he has had upon hundreds of young men and women, trained to perceive the vast resources of a beautiful world. For Professor Green has seen with that keener vision the infinite design of Nature; he has, with that more attentive ear, listened to the "still small voice."

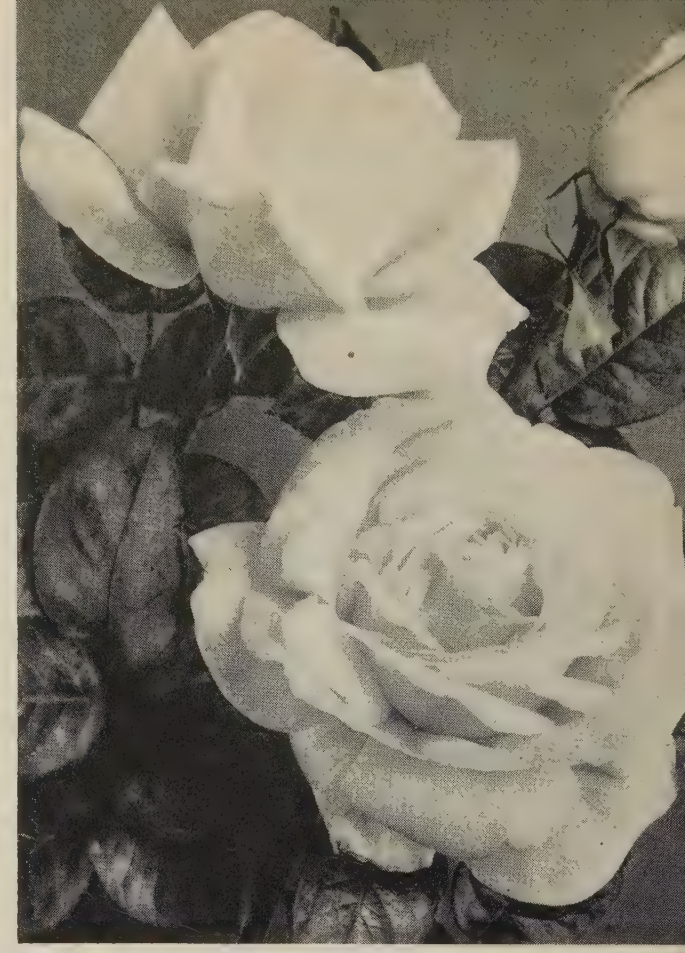
Bird Burial

By ULRICH TROUBETZKOY

Fold these crushed wings, caress
the feathers meant to fly;
Commit to earth this flesh
intended for the sky.

What a small grave will hold
the remnants of a bird!
A spoon of dust will tomb
the song no longer heard.

"Peace," the new hybrid tea rose introduced by the Conard-Pyle Company, of West Grove, Pa., has been given a national rating by the American Rose Society of 9.5 of a possible 10, their highest rating of any rose to date. Peace was bred in France by Francis Meilland, who has produced a number of outstanding varieties.



New Stars Rise in the World of Plants

By ANDREW S. WING

Executive Secretary, National Garden Institute

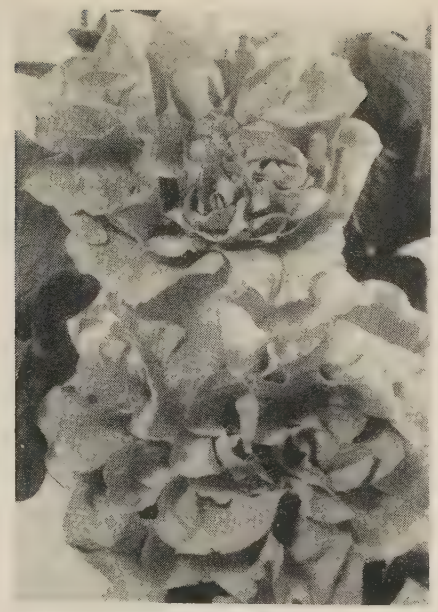
IT IS time again for the plants' stars to shine. From gaily colored catalogs they flaunt their charms. Roses from Europe; shrubs and perennials from skilled hybridizers, here and abroad; fruits and vegetables from the four corners of the earth, but mostly from our own skilled plant breeders, who are now unsurpassed in this important field. Not even war can stop these men from carrying on their important work of cooperating with Nature, creating new colors and forms of flowers, vegetables and fruits that yield more plentifully, or that have finer flavors, or are more resistant to insects and disease.

The All-America Selections are always announced on January first, except the rose winner for 1946, which was released September 1. So much has already been written about Peace, the great new rose, that it seems unnecessary to say more than that it has been unanimously approved by rose growers everywhere.

Peace, the only rose to receive All-America honors in 1946, has been described as the "most dramatic rose in years." Appropriately enough, it is French in origin, having been bred by the famous hybridist, Francis Meilland, and introduced over here by the veteran Quaker rosarian, Robert Pyle. It won first prize in the Lyon Flower Show in 1942, but came to us as a refugee from the Nazis several years later. During the San Francisco Conference it was displayed and generally acclaimed. Then someone had the happy idea that it should be named "Peace," so Peace it is. It is a yellow, many-petalled flower, suffused with pink, and, in favorable locations, sometimes opens to an extreme width of six inches. It is a truly beautiful rose that deserves the honors it has received.

The only rose selection for 1947 is Rubaiyat, which produces a large flower that is cerise-rose in the bud, deepening in color instead of fading as it opens.

Red is the color enjoying greatest popularity among chrysanthemums at this time, and Red Trojan, developed by Jackson and Perkins, is almost a wine red. It blooms in late September and through October, surviving the early frosts.



Four Burpee creations that have received All-America honors for 1947. Left is Velvet Giant, a snapdragon with deep crimson blooms, with an undertone of orange, and a bronze medal winner. Center is the all-double petunia, Mrs. Dwight D. Eisenhower, silver medal winner. Right is Rose Marie, another all-double petunia to which a bronze medal was awarded. Below is the marigold, Naughty Marietta, a dwarf French single marigold given an honorable mention award.

Vigorous in habit, this new creation of Samuel McGredy promises to be a worthy successor to Peace, the sensational rose of 1946. Although I have not seen it, we can be sure that it is a superior introduction.

Heading the 1947 annual flower selections is a petunia, appropriately named after Mrs. Dwight D. Eisenhower. This tops the list and wins the silver medal. It is a uniformly all-double dwarf variety, about sixteen inches high, with flowers that are a soft salmon shade, two and three-quarter inches across.

Another all-double petunia, Rose Marie, wins a bronze medal. It is of bushy, erect habit with rose flowers that are three inches across, and borne well above the foliage, making it good for borders and cutting. Still another bronze medal goes to the snapdragon, Velvet Giant, a tall, base-branching plant with six to twelve spikes bearing a profusion of large crimson blooms with an undertone of glowing orange-bronze. The name comes from the velvety texture rather than the color.

Naughty Marietta, the latest contribution of the house of Burpee to the growing list of marigolds, gets an honorable mention. It is of the dwarf French type, the plants being a foot tall and considerably broader. The flowers are two or more inches wide, golden yellow, and the base of the petals is marked with mahogany red. It is an extremely showy variety for beds and borders.

Vegetables did not show up so well in the All-America Selections this year, but there are two bronze medal winners and an honorable mention. Bronze Beauty lettuce is a newcomer in the Oakleaf class—and if you have not tried Oakleaf yet, you have missed something very good in the way of lettuce. Bronze Beauty has the same characteristics but is bronze in color, looseheaded and with crisp leaves that stand heat and drought very well. It is easy and fast growing.

Ranger snapbean also wins a bronze medal. It is a greenpod, disease-resistant, high yielding and of excellent quality either fresh or as dried beans, which are white. The pods are round, straight, stringless, silvery green and are mostly borne in the crown of the plant. You can begin picking them in fifty-six days. This bean is vigorous and prolific, and of the Refugee type.

Erie sweet corn, a new hybrid with widely adapted usefulness, gets an honorable mention. The long, cylindrical ears are nine inches long, slightly tapered, and are ready for picking in eighty-eight days or three or four days later than Golden Cross Bantam. The plants are six inches taller and are wilt-resistant, vigorous and drought-resistant. This sounds like something worth trying for those who have room for more than a few rows of corn. Another new corn being introduced by Northrup, King & Company is Hybrid 1018, to be renamed shortly. It is early, almost in season with Spancross, and has a better plant and a larger ear. Quality of this corn is said to be good.

This Christmas rose, *Helleborus niger altifolius*, is a Jackson and Perkins novelty. Its snow-white flowers with their green-tinted centers are a delight when growing in the garden in mid-winter.

Two new beans are announced by Northrup, King & Company, both introductions of the U. S. Department of Agriculture. One is called Logan and is similar to Tendergreen in appearance. It is resistant to mosaic, of good quality and vigorous. Another U. S. D. A. introduction, named Rival, is similar but will not be available until 1948.

Those who have tried muskmelons without much luck might try Iroquois, a new wilt-resistant variety from Cornell University. It is being featured by Northrup, King. It is said to be of excellent quality, with a small seed cavity and orange flesh, and is suited for home use as well as roadside trade. In the field of ornamental plants there are many interesting items of note in addition to the All-America selections already mentioned. One of these is Sunset Glory, a new hybrid tea rose of Jackson & Perkins. It has soft pastel blendings of rich sunset colors on flowers that open to four or five inches. The plant is vigorous and the blooms are borne profusely. Good chrysanthemums are so common these days that it is hard to decide which is best. It is fine, however, that so much attention is being paid to this grand hardy plant. Red Trojan is one that seems to merit attention because of the unusual wine-red color. A hardy outdoors variety, it stands erect and is very floriferous, the blooms from two to two and one-half inches across.

If you have never known the thrill of picking a rose from a bed of snow, you have a treat in store. We mean, of course, the Christmas Rose, *Helleborus niger*, which is a tough native of the Swiss Alps. A new strain *altifolius* is said to be a greatly improved form of the old variety, which bloomed from November to March. The plants like a rich soil and partial shade, but once happily established in the garden they will bloom for years, the foliage being an attractive green in the summer months.

A bleeding heart that blooms all season will be new to many people. Actually it is more like its cousin, Dutchman's Breeches, but it is a charming flower, with fern-like foliage, for a rockery or shady spot. The Latin name is *Dicentra formosa*, and the variety listed by Jackson & Perkins as "Sweetheart" is said to be superior. It spreads rapidly in fertile soil.

One of the loveliest of all hardy spring flowers is the columbine. Aquilegia Super Long Spurred is a Vaughan introduction from England. It is said to produce flowers four inches across and twice the size of the famous Scott Elliott hybrids. The shades are mostly bicolor: blue-white, pink-white, yellow-white, and so on. Although mere size is nothing to rave about, this sounds like something everyone should try, and it can be flowered the second year from seed. Swiss Giant pansy is a new break in colors, also from Vaughan; a big, (Continued on page 52)

Rubaiyat is a hybrid tea rose producing a large flower that is cerise-rose in the bud, the color deepening as the bloom opens. Developed by Samuel McGredy, it is from Jackson and Perkins.

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

Astronomical Predictions for 1947

By ISABEL M. LEWIS

DURING the year 1947 there should be a marked increase in solar activity, with more sunspots, more magnetic storms and auroral displays, and more interference with radio transmission. This we may expect because it is now several years since the sunspot minimum occurred, and the rise to the sunspot maximum period is generally more rapid than the decline from maximum to minimum. In the past year there occurred the largest sunspot group ever recorded, and, although a group of sunspots of great size may appear at any time, it may be expected that, in sustained solar activity and total number of sunspots recorded, the coming year should surpass the preceding one.

An interesting event during the coming year will be the fine total solar eclipse of May 20. The total phase of this eclipse reaches a maximum of more than five minutes, which is considerably more than the average duration of totality, and, moreover, the greater part of the path lies over land. It is quite certain that there will be a number of scientific expeditions sent from this and other countries to observe this eclipse in South America, or Africa. The path of totality passes over Chile, Argentina, Paraguay, and Brazil, in South America, and Liberia, the Gold and Ivory Coasts, the Cameroons, French Equatorial Africa, the Belgian Congo and Kenya in Africa. Those who are particularly interested in this eclipse can obtain from the Superintendent of Documents, Washington, D. C., the Supplement to the American Ephemeris and Nautical Almanac for 1947 on this eclipse for 25 cents, including large scale maps of the path in South America and Africa. Partial phases of this eclipse will be visible over all except the extreme northern part of South America, the entire continent of Africa, and the Atlantic Ocean between these two

continents, thus favoring ocean travelers.

There are, in all, three eclipses visible in 1947. In addition to the total solar eclipse of May 20, there will be a small, partial eclipse of the moon on June 3, the maximum magnitude of which will be only about two-hundredths of the moon's diameter. This eclipse will be visible in general in Europe, except the northwestern part; Asia, except the northern part, Antarctica; the Indian Ocean; Australia; the western and southwestern part of the Pacific Ocean; the South Atlantic Ocean, and Africa.

On November 12 there will be an annular eclipse of the sun. This is the type of solar eclipse in which a thin ring or annulus of light is seen surrounding the moon at time of greatest eclipse, if one is situated within the path of the annular phase. In the November eclipse this path will lie mostly over water, passing from a point in the North Pacific Ocean south of the Aleutians, in approximate latitude 41 degrees North, longitude 173 degrees West, in a southeasterly direction. The path will cross the equator in longitude about 113 degrees west, and reach the coast of South America in the vicinity of Talara in Peru. It will leave the earth at sunset in Brazil. The maximum duration of the annular phase of this eclipse will be about four minutes. Partial phases of this eclipse will be visible over nearly all of Alaska, western Canada, nearly all of the United States, Central America, and the greater part of South America. The northern limit of this eclipse passes through the Great Lakes region and southeastern Canada. The greatest magnitude of the eclipse in the United States will be on the west coast, where only four-tenths of the sun's diameter will be covered by the moon at maximum phase. In the central, mid-eastern, and New England States the greatest magnitude will be only a few hundredths of the sun's diameter and hardly visible to the naked eye. In Chicago and Boston it will be only one-hundredth, and in Washington four-hundredths.

On January 16 there will occur the comparatively rare phenomenon of the occultation of a bright planet by the moon, in this instance the planet Jupiter. An occultation is a temporary hiding of a star or planet by the moon. It may last anywhere from a second or so to more than an hour and a half, depending upon the circumstances of the occultation and the position of the observer. Occultations of stars and planets are of importance astronomically in that they help to fix accurately the position of the moon and improve the tables upon which the calculations of its position are based. Every year there are between 1000 and 2000 occultations of stars by the moon. These stars are of the sixth magnitude or brighter, but only a few hundred of these are actually observed, either because of bad weather or lack of observers. The disappearance of a star behind the moon, the immersion as it is called, is sudden, and its reappearance, or emersion, occurs with equal suddenness. This is taken as one proof of the lack of an atmosphere on the moon. If an atmosphere were present, the dimming of the light of the star as it passed through the lunar atmosphere above the limb would be gradual, but no such effect has been observed. In the case of a planet with a dense atmosphere, however, such as Venus, or Jupiter, or Saturn, and with an appreciable disk, the disappearance is more gradual. For this reason, also, occultations of planets by the moon are not as valuable as occultations of stars for the purpose of correcting the lunar tables, as there is more uncertainty as to the exact time of the event. They are, however, much more spectacular in appearance, because the brilliant point of light seems to hang for an appreciable length of time upon the edge of the moon, both at time of disappearance and reappearance.

The occultation of Jupiter by the moon on January 16 will occur in the eastern states soon after sunrise, but because of the great brightness of the planet, second only to that of Venus, it should be possible to see it with the aid of binoculars, possibly even without any telescopic aid if the seeing is good. At Washington the immersion, or disappearance, of the planet, which will take place at the bright limb of the moon, will occur at 7:55 A.M., Eastern Standard Time. The emersion, or reappearance, will be at the dark limb of the moon and will occur at 9:06 A.M., or one hour, eleven minutes later. The times of these events will vary quite considerably in different places, but the difference will amount to only a few minutes if the places are only fifty miles or so apart. In central Massachusetts the disappearance of the planet behind the moon will take place at about 8:11 A.M., and the reappearance at the dark limb at 9:02 A.M. In the central states the occultation will occur under more favorable circumstances, as (Continued on page 49)

Winter Night

By HERBERT MERRILL

The air is frosty now and brittle thin,
It bites and prickles when you breathe it in.
The hard snow under foot squeaks like a mouse.
Old wooden timbers sigh inside the house,
And stars bend closer every night until
A man could lift his hand and pick his fill,
And come home staggering with a full sack
Of shining fire upon his crooked back.
On nights like this you listen for the creak
Of earth upon its axis. You can speak
With angels if you like. They come to stand
Just north of here with lightning in their hand.
But if you'd rather not see golden stairs,
Go early then to bed and say your prayers.

The School Page

Edited by E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association.

WHAT'S NEXT?

THE TITLE of this article was suggested by a famous cartoon of 1946. The cartoon showed a harried (not a pun) leader of our government obviously greatly disturbed over many difficulties that were arising in the administration of our nation's affairs. The chaos suggested by the cartoon was accentuated by a press release of a national organization concerned primarily with the education of kindergarten children. If government officials have cause to be worried over situations they themselves may have created, it would seem that some of us educators have cause to worry over developments in our field and for which we, too, are no doubt in part responsible.

The press release calls for "Education for the Atomic Age," and suggests "appropriate"(?) lessons for the kindergarten to further the cause of this ultra-modern slant on educational programs. I confess I was disturbed to think that we had come to a point where we had to teach kindergarteners how to combat atomic bombs, but I was even more disturbed to see how it was proposed that this be done.

One of the major weaknesses of much of our educational work lies in the abandon with which we use as analogies things that are not analogous. We do it in the kindergarten, through the college, and on into adult education, and some of the examples of this practice are about as sensible as the sales argument for an electrical belt in San Francisco some years ago. The belt was supposed to be good because it was developed by a gentleman by the name of Wilshire. There was a famous boulevard in Los Angeles by that name, so the belt must be good for what ailed you. Further proof that the belt was good was claimed because the inventor looked like George Bernard Shaw. Somehow, I did not get the connection. Neither do I follow the reasoning in the press release mentioned. I cannot speak with authority on electrical health belts, but I believe I have some judgment about the inter-relationships between the common birds when used as a vehicle for introducing kindergarteners to the vicissitudes of the atomic age.

The release suggests for Monday's lesson the following:

"In our parks the doves and sparrows feed together, and the smaller birds are never tyrannized over by the larger. The bad-mannered sparrows are quite out of place among the doves; yet the latter never become contaminated by sparrow conduct, nor do they attempt to force these badly-behaved birds to conform to their own 'higher standards of living'. Perhaps they know intuitively that development is a step-by-step process. Children in kindergarten usually manifest a similar intuition. It is possible that world security would be more easily won did their elders consider the doves and the children." Now I ask you to read that quotation over again slowly, and to check it with your own observations of sparrows, pigeons and children. See if you can agree with a single statement in it. I can not. I rather think that if the doves leave the "bad-mannered" sparrows alone it is because they have learned through experience that the little toughies are perfectly able to take care of themselves. Certainly, I do not give them credit for knowing that development is a step-by-step process, and adjusting their behavior accordingly. Neither do I acknowledge that kindergarten children "manifest a similar intuition." At any rate, there have been some kindergartners in my family, and there are some in our neighborhood, who do not fit into that picture at all. It is tripe such as is offered to us in this quotation, crudely chosen from the field of Nature study, that has given Nature study more than one black eye, even though it is not Nature study at all, if we are to *study* Nature and not imaginings *about* Nature.

The release quotes Publius Syrus to the effect that: "It is only the ignorant who despise education." I cannot quote anybody in refutation, but I am willing to wager that there are some things that pass as education that are despised by a considerable proportion of the sapient members of our generation. When educators get to the low level of the politicians, and begin to malign the intelligence of their critics, we can well wonder "What's next?" in our field of human endeavor. I can see little tie-up between the reputed adjustments sparrows and doves make and education for the atomic age. Certainly, I can see no cause to present anything needed by kindergartners on the subject through what might be taken to be an analogy. I am allergic to analogies in general, but particularly to pseudo-analogies. And if we must choose our illustrative examples from the field of Nature, I am sure it is the policy of The School Page of *Nature Magazine* to recommend at least a reasonable adherence to the facts.

If we can begin at the kindergarten, or at earlier levels, to show the coming generation the relationship between cause and effect; if we can give these young folks the beginnings of a sense of responsibility that has been progressively weakened as the weak or lazy or improvident have sought freedom and security at the expense of the strong, the ambitious and the provident, we will have done much to develop a self-reliant generation capable of meeting the demands of the atomic age, whatever they may be. Of course, the strong will always feel better if they help the weak, and the provident will wish, on occasion, to help the improvident, but when the improvident and lazy *demand* that they be supported by those who are able and willing to work, that is another story. Dependent suppliants can never build a strong, independent civilization. We have gone through at least a decade of destruction, of dissipation of our resources, of honoring the one who takes from society without giving anything in return. Possibly, it was necessary that some of this be done. Of course this criticism could could not be directed towards the splendid military record of our young folks. If, in the next decade, we can only change the direction of trends taken by many social scientists, we can at least see some hope in the future. Otherwise we are sunk deeper than any atomic bomb can possibly send us. But we must have our feet on the ground. We must not assume that a dove knows intuitively that development is a step-by-step process. He probably knows nothing of the sort. It may be fun to be idealists, but the time comes when we must also be realists. I rather think that among the attitudes that are next in our schedule is a partial return to realism. We do not wish to lose our idealism, but we must temper it with realism. What chance will the doves have in an atomic age if the sparrows are masters of atomic energy?

In justice to the group that prepared the material introducing children of the kindergarten age to the atomic age, I must say that, while in my judgment they went completely haywire in their recommendations for Monday's program, they did show a tendency towards realism in their proposals for Saturday. Having suggested that the children become doves of peace on Monday, the planners for this atomic age recommend that Saturday be devoted to lessons guaranteeing that the children have good teeth. Since teeth were probably among the more primitive of weapons, there may be some philosophy back of the recommendations that I have been too ignorant to perceive. All I can say is that, atomic age or no atomic age, the only really satisfying way to face what is next for all of us is on a basis of self-reliance, and the only way to build is to learn to add first. We cannot go forward backwards.

Slides from the films "Rip Van Winkle" and "The Wanderings of Odysseus," and a scene from "Arts and Crafts in Mexico." All of these are from educational films distributed by Pictorial Films, Inc.

Camera Trails

By EDNA and BILL EVANS

SCHOOL AND CAMERA

In this section of "Camera Trails," without intending to poach on the preserves of E. Laurence Palmer and his "School Page," we are going to discuss some of the many ways in which cameras and photographic techniques are being adapted to the modern classroom. "Visual education" is the technical name for this type of learning, although visual education also includes more than just photographic material.

People who finished school more than a decade ago probabily do not realize the extent to which movies have become a part of the classroom procedure. Grown-up Nature lovers would get a big "kick" out of sitting in on some of the programs presented for the various science classes, especially those in biology.

Most of the movies shown to high school classes are professionally made, distributed for a small fee by various "film libraries", and circulated from school to school in a business-like manner. Some schools have a regular movie day every week and keep a steady stream of pictures coming and going throughout the year.

Those biology movies are fascinating to anyone really interested in Nature. Some movies are silent while others have a sound track, dispensing either music or words of explanation spoken by a voice as pleasant and soothing as that of the best paid radio announcer.

The subjects are legion. By means of 16mm. film, projector and screen, the spectator can plunge into the world of the microscope and see many of the fascinating activities that go on in a drop of water. Slipper-shaped paramecia (magnified to better than size-11 shoes) skitter across the screen in droves, looking like Main Street traffic on a busy Saturday afternoon. Amoebas languidly extend their pseudopodia and divide into two individuals while the audience looks on. Colonies of stentor shoot out their trumpets, while rotifers whirl their cilia like pinwheels on the Fourth of July.

Moving up a step or so in the scale, mushrooms grow before the eye, springing up like parasols and wilting again, all in the space of half a dozen breaths or so. The entwining tendrils of dodder coil around a host and begin to smother the life from it, while retarded photography records the whole process and transposes the actions of hours into seconds on the screen.

School audiences can watch mother birds feeding their young, can see the water ouzel strolling along a stream bottom, can travel to the Arctic with the students of glaciers, or to the tropics with the pearl divers. Classes can witness modern methods of insect-proofing corn and wheat fields, can follow a problem in genetics through generations of guinea pigs, can see for themselves the needs for forest fire prevention and wildlife conservation without ever going outside the school door, although nothing is better than field knowledge.

More than that, they can follow the lives and struggles of the great scientists. They can watch Marie and Pierre Curie at work, can study the tsetse fly with David and Mary Bruce. They can watch Doctors Ehrlich and Semmelweiss battle against the self-satisfied backwardness of their fellows. They can hear the human heart beat—"flub-dub, flub-dub"—and they can see the circulatory, the digestive and the respiratory systems in action.

Nor are science classes the only ones to benefit from such informative movies. There are pictures for history classes, for English and literature classes, for home economics, for mathematics, for physics and chemistry—for every subject in the modern school curriculum. Some are funny, some are serious, some run a few minutes, others for the better part of an hour.

There are other visual aids, too, connected with photography. Some of these can be produced locally, if the class or the teacher is so inclined. Not many motion pictures can be produced on a high school level, but many colleges make their own pictures. Many a college biology teacher shows his own movies to his classes.

But there are less complicated visual aids that can be made and used by the interested below-college student or the teacher. Most schools now own at least one slide and strip film projector, as well as one that shows motion picture film. Strip film and slides can be used to good advantage and can deal with subjects close to home. Anyone with a liking for photography and a 35mm. camera can make them.

"Film strips" can be obtained from many sources, and so can slides. These have the advantage of cheapness, and many schools have accumulated their own strip or slide film libraries. Suppose the general science teacher wants to have a lesson on "glass making." He simply gets that film strip from the library, sets up the projector, and proceeds to give an illustrated lecture. The history teacher can show scenes of historical interest; the social studies teacher can make use of those dealing with travel, safety, or a dozen other subjects.

If a teacher or pupil is interested enough, he can go out and take his own pictures. Classes in different localities might exchange pictures—a class in Vermont exchanging apple orchard pictures with orange grove scenes taken by a class in Florida. Biology classes on the coast could exchange marine life pictures for mining scenes, farming shots, or a

dozen and one others.

We have never heard of any such exchange, but we think it would be a good idea and we would be interested in knowing whether anyone has ever tried it.

So, people who have never seen a visual aid program, will have a pleasant surprise, as well as an entertaining one, in store if they ever visit a school and see the movies. However, there is a fly in any ointment. The old saying about "leading a horse to water" holds true in schools, too. A teacher can lead her young charges to the fount of knowledge, but she cannot force all of them to drink. We have seen youngsters sit during visual aid periods and read comic books. They would rather do that than look at the motion pictures.

NEW EDUCATIONAL FILMS

During the war most of the educational films produced had to do with current wartime problems, and considerable numbers were filmed or distributed under government sponsorship. The nature of these is indicated by a few of their titles: "Weapons of War" (OWI), "We've Got Another Bond to Buy" (U. S. Treasury), "What's Happened to Sugar" (OPA), "Grow Your Own" (USDA), "Hidden Hunger" (Federal Security Agency), "First Steps in First Aid" (Bureau of Mines), and scores of others.

Now that interests are turning elsewhere, other new visual aid subjects are being offered. Recently, for example, Pictorial Films, Inc., announced three new color slide films as being ready for release. They are "Alice in Wonderland," "Rip Van Winkle" and "The Wanderings of Odysseus." These follow three other sets, released by the same company, "The Three Musketeers," "Ivanhoe" and "Treasure Island." All six may be obtained in either 35mm. slide film, full color, with approximately 100 frames per film, or in sets of approximately 100 2x2 individual color slides.

The same company began, in October, the production of a short, educational, documentary film on the history and functions of the United States postal department. Other films dealing with the departments of commerce, justice, treasury and agriculture will follow.

And, just to show that the visual educational program is not beyond the scope of amateur photographers, two amateur-made movies are included on the list distributed by Pictorial Films—these are "Arts and Crafts in Mexico" and "Inside Story," the latter showing how to cook a duck—and how not to.

BETTER PROJECTION

From Eastman Kodak Company comes the announcement of an improvement in the projection of slides and 16mm. movies. This consists of a coated or "Lumenized" lens for Kodascope and Kodaslide projectors—the result being greatly increased screen brilliance.

The lenses, coated with a microscopically thin layer of magnesium fluoride, are said to give increased brilliance of as much as 50 percent with slide projectors and as much as 33 percent with motion picture projectors. The result means additional light on the screen without added heat (which would result from increasing wattage of the projector bulb) in the machine. Camera lenses have been coated as the result of wartime discoveries, and now projector lenses are coated also.

CORRESPONDENCE WANTED

We have begun to receive more letters and suggestions from "Camera Trails" readers, and we hope they will continue to come in with increasing volume. It has been rather difficult, up to now, to give advice in reply to the most frequently asked question, "What camera shall I buy?" But now that more makes and kinds are available, we are finding that question easier to answer.

Still, we would like more "hints" as to what camera enthusiasts want to read about. We would like to swap problems, too, and see how other folks do things, in return for our own explanations of how we do them.

Nature Picture Salon

To demonstrate the wide field that Nature offers to the photographer, and to make available for public viewing the best in Nature photography, the Second Chicago International Exhibition of Nature Photography will be held at the Chicago Natural History Museum in February, 1947. All Nature photographers are invited to submit entries for the salon, and further information may be obtained from H. J. Johnson of the Nature Camera Club of Chicago, 1614 W. Adams Street, Chicago 12, Illinois.

Ruffed Grouse

The Ruffed Grouse. By Henry Marion Hall. New York. 1946. Oxford University Press. 91 pages. Illustrated in color and black and white by Ralph Ray. $6.50.

Although containing much of interest to the average bird student, this attractive book is written mainly for the consumption of the gunner, being largely a collection of articles previously published in sporting magazines. The text is well written and informative, and the large-sized illustrations are excellent.

Wants to Exchange

John B. Smartt, 36 Botanic Road, Glasnevin, Dublin, Eire, writes us that he is actively interested in Lepidoptera, particularly butterflies, and would like to get in touch with amateur collectors with a view to exchanging notes and specimens.

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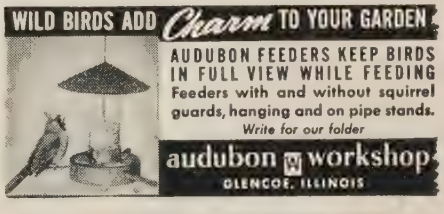
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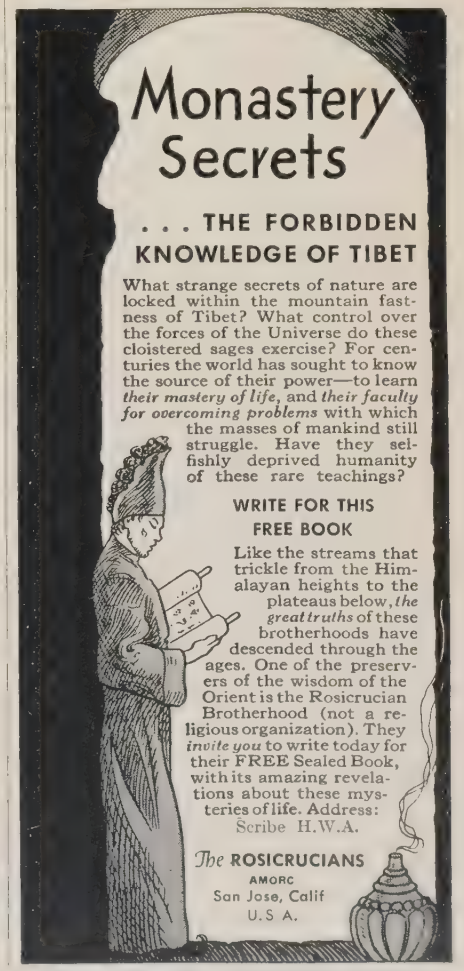
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THAT WONDERFUL COCONUT

(Continued from page 17)

fishes. The matting of the coconut, which binds the fronds to the trunk, is used for protective clothing in rainy weather. This matting is also used to calk native canoes, being mixed with the rubber-like sap of the breadfruit tree. The separated strands of the nut's husk are braided or twisted into a stiff fiber, which is elastic, impervious to salt water, and is stronger and more durable than manufactured hemp or cotton rope. A heavy rope, called *ranarana* by the Polynesians, is used by many of the pearl divers of the Tuamotu atolls for securing their coral-boulder anchors, pearl-shell baskets and diving weights. This wonderful coconut rope is the only lashing the islanders will use to bind the outrigger booms athwart the gunwales of the canoes. Coincidentally, it has been found that the coconut palm flourishes better when it has its roots in soil close to salt water.

Drinking cups and bowls are made from the shells of the coconut. Bailers, found in every outrigger-canoe, are fashioned from the half-shell. Once, while crossing from Tahiti to Moorea Island in a canoe, a heavy sea almost swamped us, but the quick use of the coconut-shell bailer saved us from sinking in shark-infested waters.

The hard shell of the nut is used to make a charcoal that is superior to the common product. The natives of the eastern Polynesian archipelagoes save the husks of coconuts for fuel. The small electric plant in Papeete, Tahiti, uses coco husks in place of coal or oil for the steam-engines that whirl the dynamos.

Many of the bristly doormats, with "Welcome" superimposed upon them and found in front of the doorways of modern homes in America, are made from the fiber taken from the coconut husk. Brushes and brooms also use this strong fiber. The native medicaments of Polynesia hold strictly to the milk of the nut. Once, when extremely ill from the stab of a poisonous *nohu* fish, frequent doses of coconut medicine administered by a native doctor dispelled my fever and misery.

The most important product that the coconut palm yields for the outside world is copra, the chief export of Polynesia. The nuts, split and left to dry in the sun, are shelled, placed on long racks to dry, then sacked and transported on trim white trading-schooners to Papeete, Tahiti. Here the copra is loaded into the holds of monthly steamers for America and Europe. When this valuable cargo reaches its destination it is taken to modern factories where the oil is extracted for a base product in the manufacture of soaps, emollients, candles, shortening and cosmetics. The oil cake made from the coconut is a valuable cattle food. The shredded meat is a crowning garnishment for desserts.

While living on a low coral atoll in the Tuamotu Group my life was saved by a palm. The natives of the Low Islands frequently have to take to the coco palms during the hurricane season, which is from December to March. The fronds of the palm are lopped close to the bole so that it will offer little wind resistance. Then the trunks are lashed together with coconut rope, giving each tree the support of its neighbor during the savage assault of rain, wind and sea.

I was awakened one night, my ears filled with the deafening boom of the sea over the outer reefs of the atoll, and the hissing sound of the rain falling in blinding sheets. I knew what was at hand, and my heart leapt into my throat! I had heard ghastly stories of the havoc wrought by hurricanes in the Dangerous Isles. Struggling against the strong wind and rain, my native friend, Roo, and I found the palm previously prepared and allotted to us for just this emergency. We scurried swiftly into the clipped top of the palm. Straddling the severed base of a frond, I clung with all my strength. The wind all but tore me loose, and many times the trunk bent far over and made loud cracking protests, causing me to shake my head dismally at Roo. Below, the wild seas had overleapt the coral reefs and raged six feet deep across the southern end of the atoll.

The hurricane, which Roo declared was not as serious as the usual ones, passed in the early morning, and we slid down the bole of our particular palm, sore, stiff and exhausted. The rain had lashed my back as though with leaden pellets, and now the slightest movement caused misery. What a sight met our eyes! The entire southerly section of the atoll was ruined for many years to come. Dead pigs, fowl and seabirds were buried beneath the wreckage of palm boles, pandanus and canoes. Some of the natives had perished in the hurricane. My tree had been set askew by the force of the assault, but it had held. I have always had a deep affection for the coconut palm since this incident.

THE GRAND COULEE OF WASHINGTON

(Continued from page 37)

per inch. Giant Sequoias, similar to those in California, once flourished here. In one instance of tunnel work a large petrified log was found encased in lava rock 700 feet below the present ground surface, indicating that at some time in the dim past a great forest had been swept by the fiery flood of molten lava.

In other alluvial formations have been found well-preserved camel knuckle bones. In a deposit 130 feet below the ground a complete set of mastodon teeth, and a portion of the tusks, were unearthed. The little three-toed horse existed in great numbers, and later came the mammoth and the giant sloth. The moist air of the coast regions penetrated the enterior. The warm Japan current flowed across Alaska, and the Gulf of Mexico extended far to the north. The change from subtropical climate took place with the elevation of the mountain barriers on the coast, which diverted the Japan current. The ocean drained from the Alaskan plain opening the land to the Arctic cold, and the Rocky Mountains were further elevated. Thus, we may picture a land covered with a flourishing semi-tropical jungle roamed by fantastic creatures of the past, where now only a dry and desolate landscape greets the traveler.

Today all is quiet. But as one trudges through these silent canyons, and reads the record written in the rocks, this great pageant of history rises vividly before him. One cannot help but stand in awe and bow his head in reverence before these gigantic forces of Nature.

Listen and/or Read

There has recently been brought to our attention something new in educational-entertainment material for the younger child, specifically those between the ages of four and eight. This is what is known as the "Graphic Phono-Book," a quite descriptive name for a clever idea. Physically a "Graphic Phono-Book" is a combination of picture book and story record. The regular-sized, double disc is in an envelope in the front of the book, followed by sixteen to twenty pages of the story, attractively illustrated in color. This text is substantially the same as the recording, plus some additional information to be read by or to the youngsters. We have listened to and have read four of these "Phono-Books"—"Who Was Aesop?", "Why Are Bees So Busy?", "What Makes It Rain?" and "Why Do I Have to Go to Sleep?" The recordings are splendid, with excellent background music, fine choice of voices and a general presentation that should be absorbing and informative to any youngster. The anthropomorphic approach is sometimes used, and, while we avoid it in *Nature Magazine,* it is justifiable for the audience sought by these "Phono-Books." The story is simple and well told, and the illustrations delightful. We gather that it is the intention of the producers to build up titles in five major groups, answering questions of who, why, what, where and how; questions the average youngster might be expected to ask. These "Phono-Books" are produced by Graphic Educational Productions, Inc., 1108 Lillian Way, Hollywood 38, California. They will be distributed through regular commercial channels.

ASTRONOMICAL PREDICTIONS FOR 1947

(Continued from page 44)

the disappearance will occur before sunrise. In latitude 40 degrees and longitude 91 degrees, and places near that location, the disappearance will be at 6:20 A.M., Central Standard Time, and the reappearance at 7:44 A.M. This is an exceptionally long occultation. The farther west the observer, the earlier the occultation will occur. Near the west coast, in latitude 36 degrees north and longitude 120 degrees west, Jupiter will disappear at the bright limb of the moon at 3:57 A.M., and reappear at the dark limb at 4:51 A.M., Pacific Time. Observers in the western states will have the advantage of having both phases of the occultation occur with the sun well below the horizon.

Venus is now a brilliant morning star and will be at its greatest western elongation on January 27, rising more than four hours before the sun in the southeast. Mars is now nearly at its greatest distance from the earth. It is not visible in January as it is in conjunction with the sun on January 6. Its distance from the earth will then be about 224,000,000 miles. During the year it will gradually approach the earth, passing, in turn, through all the zodiacal constellations from Sagittarius eastward to Leo, where it will be at the end of the year. The distance of Mars from the earth will then be reduced to about 83,000,000 miles. It will not be in opposition and nearest the earth until next year. Mercury and Mars will be in conjunction on January 18. Mercury is in superior conjunction with the sun on January 23, and is also too close to the sun to be seen this month. Jupiter is now high in the eastern sky at sunrise in the constellation of Libra, where it will remain until November, when it will pass into Scorpio. Saturn is now in fine position for observation in Cancer. It will remain in this constellation until September and will then pass into Leo. On January 26 Saturn will be in opposition to the sun and visible all night.

Water and Forests

Water is the lifeblood of civilization, yet we too often take it as a matter of course, and ignore the factors that control and assure adequate supplies of water. Of basic importance with respect to water is the upland forest, the significance of which is today widely recognized. Of particular interest in revealing relationships between such forests and the vital flow of water is a new pamphlet issued as Miscellaneous Publication No. 600 of the U. S. Department of Agriculture and entitled *Water and Our Forests.* It is available from the U. S. Forest Service, Washington, D. C.

Know Yourself

The Human Frontier. By Roger J. Williams. New York. 1946. Harcourt, Brace and Company. 314 pages. $3.00.

Dr. Roger J. Williams, distinguished biochemist, is a proponent of the science of humanics. It is his contention that the investigation of man, the study of human beings, has been in the hands of specialists, and that we have fallen short of proper goals of understanding human beings because of this. Coordination has been lacking, with the result that the social application of specialized scientific knowledge has not been achieved. This book advocates this coordination, and is a thoughtful and thought-provoking volume. Its subtitle, "A New Pathway for Science toward a Better Understanding of Ourselves," is perhaps as briefly descriptive as any sentence could be. Even an extensive review of Dr. Williams' book would fall far short of presenting, or evaluating, his thesis. It is a volume that must be read in its entirety, and it should be.

Hedgerow Bulletin

Nick Drahos, who attained his measure of fame in the backfield of the Cornell football team, is now seeking more enduring fame in the field of wildlife conservation. His first important contribution in that direction takes form in the Fall, 1946, issue of the Cornell Rural School Leaflet The leaflet is entitled "Hedgerows" and is entirely prepared by Mr. Drahos. In it he emphasizes the importance of this part of the farm landscape, not only as excellent habitat for wildlife but as protection against wind, rain and snows. Indeed, this leaflet presents the hedgerow as something that is entitled to proper attention and management, and Mr. Drahos carries the ball for this conservation subject every bit as effectively as he did for the big red team.

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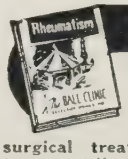

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"THAR SHE BLOWS"

(Continued from page 13)

Whales average one ton in weight for each foot of their length! They are slate-blue in color, with a small, low, triangular fin set far back on the body. The tail flukes in all whales are horizontal, unlike those of fishes, in which they are vertical. Sometimes the underside is sulphur colored, but this is caused by a growth of minute plant organisms. The Blue Whale has a number of coarse, bristly hairs on its chin.

The Finner is smaller, lighter, more streamlined, and has a ridged back. It is light gray above, and pure, glistening white below. Like its bigger relative, the throat and belly to the navel are fluted with deep parallel grooves. Males up to 80 feet in length—the record being 82 feet—females up to 84 feet—have been taken. Its coloring is invariably asymmetrical. The outside of the right lower jaw is always white and the inside black, while the left lower jaw is just the opposite.

Rorquals' eyes are small and placed just above the angle of the lips. The ear is a minute hole behind the eye. On the top of the head is a pair of holes, the blow-holes or nostrils, from which the "spout" arises in two vertical streams. Whales spout, not water, but air warmed in the lungs and saturated with water-vapor. On striking the cold air this expands and condenses, forming a visible fog.

Whales, and especially Rorquals, are not very intelligent. They are timid creatures and even small noises scare them, particularly if their blow-holes are above water, which seems to indicate that these organs are used to detect airborne waves. A man shouting will put a Blue Whale to flight. Their only enemies, apart from men, are Killer Whales, vicious creatures, colored black and white and with a mouthful of powerful teeth. Killers seldom grow to 30 feet, and average about 20 feet in length. They gang up on the Rorquals and kill them by tearing off their lower jaws. They eat only the Rorqual's tongue!

Both the Blue and the Finner Whale, when not basking or sleeping on the surface of the sea, spend most of their time feeding. When so engaged they normally cruise along at about seven to eight knots, coming to the surface at regular intervals to make four short blows in about fifteen seconds, and then sounding for from four to fifteen minutes. The maximum that they can stay below is probably about half an hour. When alarmed, however, they can outstrip any whale-chaser. The Finner is slower than the Blue Whale.

Both whales can jump clear of the water. This is an astonishing sight to witness, with animals weighing from 75 to 110 tons. Locomotion is effected entirely by the tail, powered by the tremendous belts of muscle and sinew that form the whole after-half of the spindle-shaped body. The tail does not only move up and down; the individual flukes "blade" with a twisting stroke like a pair of sculls, so that the combined motion is almost that of a propeller.

Whales, as everyone knows, are mammals. They are warm-blooded and they suckle their young. Blue Whales mate in the middle of the season when they are in the warm water—that is, in June and July in the southern hemisphere. In the same area, Finners pair throughout the season from May to August. The period of gestation is a year in both. The young of the Blue Whale average 24 feet, and, of the Finner, 22 feet, at birth—an astonishing bulk of animal to have developed from a cell no bigger than a human ovum, in a period only three months longer!

The young of the Blue Whale are suckled for six to seven month, of the Finner for twelve months. Whales secrete warm milk like all other mammals; Rorqual calves seize the nipples with the tips of their beak-shaped mouths while the mother lies at ease on her back at the surface of the sea. One calf is usual, and twins are by no means unknown among all kinds of whales.

The young of the Blue Whale are sexually mature at 28 months, by which time they are already 75 feet long. The Finners do not mature until about 3 years of age, when they are about 65 feet long. Both take 12 years to reach physical maturity. They remain sexually active for at least 20 years, but their natural life span is not known.

It has been found that there are always about equal numbers of male and female Blue Whales, while among Finners there are slightly more males. This points to their being monogamous. Rorquals usually travel in schools, Finners sometimes congregate to the number of 300.

The Sperm Whale is an entirely different animal. Everything about it is contrary to characters met with in the Blue and Finner Whales.

They are slower swimmers, usually cruising at only three to four knots, and they cannot do more than ten knots even in a spurt. They can dive to enormous depths and their breathing is amazingly regular. They remain on the surface for exactly ten minutes, taking sixty to seventy breaths, and then descend for exactly forty minutes. This they repeat over and over again.

Sperm Whales live in the warm seas. From October to March they stay between 25 degrees north and 25 degrees south latitudes. In April they move either north or south to the belts beween 25 and 40 degrees, where they stay until September. They are polygamous and have no fixed pairing or breeding seasons. The period of gestation is ten to twelve months and the young are about thirteen feet long when born. They suckle by seizing the teat in the corner of their mouths at the angle of the jaws.

The Sperm is also quite different in appearance. The head is almost a third the length of the whole animal and contains an immense tank filled with spermaceti. This is a hydrostatic mechanism to assist the animal in diving to great depths. The color is black. The tail flukes are fifteen feet across. The males seldom exceed sixty feet in length, and the females are not more than 40 feet. The Sperm Whale has no dorsal fin but, instead, a series of small humps extending from the middle of the back to the base of the tail. There is a single blow-hole slightly to the left side of the front end of the top of the snout, and the spout is oblique and curved.

Instead of baleen, the Sperm Whale has eighteen to twenty-eight large, stout teeth on each side of the lower jaw only. These fit into sockets in the upper jaw. The jaws are long and narrow, and well suited to grappling with the large octopuses and squids that form the principal diet of the Sperm Whale. This whale has a large throat and can swallow big objects. A ten-foot shark was found in the stomach of one, and another, when harpooned, vomited up over a hundred large squids.

A Sperm Whale could therefore swallow a man, although there is no authenticated case of one having done so. Certainly no other whale could do this, and it may seem significant to those who are interested in the tale of Jonah that the Sperm Whale is reported from the Mediterranean. However, it is probably that the biblical story derives from some much more ancient tale connected with early whaling in the Arabian Sea or Persian Gulf.

FIRST FLOWER

(Continued from page 20)

sailed north to continue their work.

Menzies collected continually. Many plants of the Northwest bear his name. *Arbutus menziesii,* the lovely madrona tree, recalls his visit. After his return to Scotland he kept up his interest in botany, and for a short period served as the president of the Linnean Society.

The ports of the world will remember Puget because the water area named in his honor by Vancouver has become a great shipping center. Bordering the shores of Puget Sound are Seattle, Tocoma, Everett, and Olympia, cities of western Washington.

Captain Vancouver brought his expedition back to England in 1795. He had explored and charted the northwest coast to Cook's Inlet in Alaska. He had won fame but had lost his health. He died in 1798, just before his journal was published.

THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings, or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

GENERAL REQUIREMENTS APPLICABLE TO CLASSIFIED ADVERTISING

1. *Transactions based on good faith:* Transactions are based on good faith and mutual satisfaction. Deliberate misrepresentation, disregard of usual business ethics or the attempt to circumvent these general requirements, when brought to our attention, will result in refusal of further advertising.

2. *All orders subject to these conditions:* We reserve the right to edit all copy to conform with our standards and to reject or discontinue any advertisement which we consider undesirable.

3. *Who may advertise:* This department is an open market trading post. Any individual or firm whose advertisement and methods of doing business meet our requirements may advertise their goods or services.

4. *Rates:* All classified advertisements must be accompanied by remittance. The rate is 15c per word including name and address—minimum charge $2.00. Cash with order.

5. *How to count numerals, etc.:* Groups of figures are counted as one word. Abbreviations consisting of initials or single characters likewise are counted as one word. Hyphenated words are counted as two words.

6. *"For Sale" ads must state prices:* A specific price must be stated on all FOR SALE ads —except that the phrase "write for catalog" may be used when listing real estate or merchandise in quantities.

7. *Conditions of trade or sale:* The condition of binoculars, cameras, instruments, other equipment useful to outdoor lovers, home-owners, etc., advertised for sale or trade must be specified as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable wear and only minor surface scratches or wear; GOOD—meaning moderate condition and with only moderate wear; FAIR—meaning no parts missing necessary to use, reasonable wear inside and out; POOR—meaning marred appearance or badly worn.

8. *Non-specific phrases barred:* Phrases such as "highest" or "top prices paid", as well as any other so-called "auction-type" phrases are not acceptable. The terms "fair price paid" or "state price wanted" may be used.

9. *Blind ads not acceptable:* Box number or blind ads will not be accepted. Give your complete name and address to insure prompt delivery of all mail or telegraph replies.

10. *Requesting privilege of examination:* Purchasers desirous of examining merchandise before acceptance should request shipment by express C. O. D. with examination privilege. This procedure permits the purchaser to inspect the merchandise in local express office and authorizes the express company to return unsatisfactory merchandise at shipper's expense.

11. The association will not accept for publication in NATURE MAGAZINE, advertisements of firearms, ammunition, or patent medicines.

12. *Responsibility for illegible copy:* Type or print advertisement plainly as we cannot be responsible for errors due to illegible writing.

13. *Closing date:* The closing date of all advertisements is the 20th of the second month preceding month of issue.

ATHLETIC GOODS

BAR-BELLS, DUMB-BELLS. Exercise equipment, courses. Free catalogues. Good Barbell Co., Dept. N, Reading, Penna.

AUTOMOBILE

1947 SUPERIGNITIONITER $5.50. Atomic starting, Pep, Mileage. E. G. Mfg. Co., 355U East 149th St., New York 55, N. Y.

AUTOMOTIVE

33 MILES PER GALLON, 30 miles per hour. Walert Center Flow, carburetor throttle. Walert, 3429 No. 10th St., Milwaukee 6, Wisconsin.

BOATS

SAILKIT 100 square feet $13.95, canvas all widths, New U. S. Army blankets all wool $5.95. Army pup tents $3.95, Ice skate sails, carbide lamps $1.69, Boat supplies. Alan-Clarke Co., 96 Chambers St., New York 7, N. Y.

BOOKS

ANIMALS by Seton, 295 pages, 64 kinds.....$3
Birds by Blanchan, 257 pages, 124 species.....$3
Wild Flowers, Blanchan, 270 pages, 170 kinds..$2
Butterflies by Weed, 286 pages, 109 species.....$2
Garden Flowers, McCurdy, 111 pages, 400 kinds $2
Trees by Rogers, 291 pages, 226 species.....$3
Books 8¼x5½ in., 48 color plates each. Above 6 volume set $10, remittance with order. Full refund if returned in 5 days. LITERARY MART, 8 East 33rd St., New York.

"RUTHBELLA"—Famous Sansicchi Love Diary. Original 1939 deluxe private collector's edition still available, price $5.00 postpaid. Confidential listing "Lonely Hour Books" included with order. Send $5 today and make this picturesque, surpassingly beautiful, intensely revealing book your heart's prized treasure! Poets Corner Press, Publishers, 309-3, Palisades Park 11, N. J.

"RUTHBELLA" (Sansicchi)—handy reprint edition of this famous Love Diary now available, price $2.00 postpaid. Listing "Lonely Hour Books" included. Poets Corner Press, Publishers, 309-3, Palisades Park 11, N. J.

FREE folder describing "Riding and Training," new book covering all types of riding horses. Write Earl Farshler, Box 414, Livermore, Calif.

CATALOG: complete prices, National Geographic, Desert, Arizona Highways, other items. Send 10¢. Jack Hellar, P. O. Box 2507, Los Angeles, 53, California.

BOOKS

SECURE your out of print and second hand books from The Audubon Book Service, 415 Lincoln Ave., Brooklyn 8, N. Y.

BOOKFINDERS! (scarce, out-of-print, unusual books) Quickly supplied. Send wants. Clifton, Box 1377nm, Beverly Hills, Calif.

NATIONAL GEOGRAPHIC MAGAZINES 1888-1946, any issue. Periodical Service, Box 327-N, Swarthmore, Penna.

ORIGIN, AGE of EARTH. 30¢. Christian Evidence League, Malverne, N. Y.

"BIBLE STUDIES." 70 lessons 25¢ complete. Bulletin, Box 87, Station H, New York 25, N. Y.

BULBS

AMARYLLIS BULBS, Giant Hybrids (Mead strain). Blooming size 50¢, five for $2.00, jumbo size 75¢, three for $2.00. Eighteen month bulblets $4.00 hundred. Postpaid. Amaryllis Gardens, 15 Screven Ave., N. E., Atlanta, Georgia.

BUTTERFLIES

GIANT living Silk Moth Cocoons: 15 mixed for $1.00. Living Praying Mantis Egg Masses for biological control of insects; 12 for $1.00. Postage Extra. National Nature Supply Laboratories, P. O. Box 47, Station "E", Brooklyn 7, New York.

Join the HOWELL MOUNTAIN BUTTERFLY CLUB! Enjoy the thrill of exchanging ideas and specimens with other amateurs. Annual dues, 50¢. Beginners should also have STARTING YOUR BUTTERFLY COLLECTION, price 10¢. Address Evelyn Gilstrap Williams, Sanitarium, California.

CAMERAS

CAMERAS—FILMS—HOME MOVIES. Photo supplies. Free catalog. Dayton Film, Inc., 2227 Hepburn, Dayton 5, Ohio.

CANDID CAMERAS, $4.20. Adams Service, 1009 South Seventh, Waco, Texas.

CAMERAS—MOVIE PROJECTORS—ENLARGERS. Big Free Catalog. Cavalier Camera Co., 1822 Center Avenue, Pittsburgh 19, Pa.

CAMERAS- 200 power telephoto camera easily made. Instructions 10¢. Telephoto lens and instructions $2.00. Carl Jamer, Manorville 6, N. Y.

DOGS

ENGLISH SPRINGER SPANIEL PUPS—whelped July 1st. Registered litter from famous champions and fine hunting stock, of good disposition. Lovely companions and pets, for bench, field, and home. Susan M. Otte, 1203 Bakerstown Rd., Tarentum 4, Penna.

BLACK LABRADOR, and Irish Setter pups. Registered and guaranteed. Earl Bond, Albert Lea, Minnesota.

COCKER SPANIEL puppies, championship bloodlines, registered, gorgeous coats. Mrs. D. J. Fallon, Spalding, Nebraska.

IRISH SETTERS pups, grown dogs. Reg. Best blood lines. Bill Duncan, Weston, Mo.

BEAUTIFUL, useful Collie-Shepherd pups $14 each. Paul Schultetus, New Liberty, Illinois.

EYEGLASS FRAMES

NEW EYEGLASS FRAMES beautify eyeglasses. We remount your lenses from old frame into fine new frame. Shell frames of flesh-colored zylonite $5.00. Rimless or metal frames, 1/10th 12 K gold filled, $7.00 postpaid. Pack glasses carefully and mail: Optical Shop, 7 Fairmount Avenue, Hyde Park, Mass.

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SKYSCOPE, the new 3½" reflector. Precision ¼ wave aluminized mirror. Sixty power Ramsden type eyepiece. Equatorially mounted on sturdy metal legs. Used by schools, universities. Price complete $19.75. Write for descriptive literature. The Skyscope Company, Inc., 475 Fifth Ave., New York 17, N. Y.

60 POWER TELESCOPE, $2.95. 250 power microscope, $2.45. Send for free catalog of Telescopes, Binoculars and Microscopes. Brownscope Company, 24 West 45th St., New York.

TELESCOPES, BINOCULARS, MICROSCOPES, Photographic equipment, Barometers, Hygrometers, Magnifiers, Scientific books. Buy, sell, repair. We guarantee. Lists 10¢. Specify instrument wanted. Rasmussen and Reece, 41 Market St., Amsterdam, N. Y.

BINOCULARS, 16 power (16x50) new, $150.00. Others. Mr. A. R. Sutkus, P. O. Box 373, 190 Lowell Street, Lawrence, Mass.

FISHING TACKLE AND SUPPLIES

FLY, LURE, ROD, materials. Catalog, free instruction books: "Fly-Tying," "Rod-Making," "Lure-Making," "Fly-Dictionary," each 10¢. All for 30¢. Wilbmarths, 90 E. Clinton Ave., Roosevelt, N. Y.

U OF I
LIBRARY

COOSIE WAS A STOWAWAY

(Continued from page 22)

few snatches of uneasy slumber.

I do not know how the Pan-American Airways officials would have reacted had they known Coosie was traveling aboard their big new clipper. The truth was, they were not informed of their extra passenger. Coosie went aboard as hand luggage in her little gray and white suitcase, slept peacefully through a rather bumpy thunderstorm over Cuba, and was only beginning to chirp plaintively when the ship settled down at the Miami airport.

And there we became enmeshed in red tape.

Arrangements I thought complete had failed to materialize, and there was no telegram waiting, approving her admission. The perspiring customs man put the blame on Pan-American, and the airport manager looked resigned and strove to be helpful. Coosie and I just waited.

Finally, after Coosie had spent four nights and three days of involuntary residence in a veterinarian's boarding kennel, her permit to enter arrived. The delay was understandable, however, for we had come in on a weekend. Also, the Fish and Wildlife Service had made a wartime move to Chicago, and I was bombarding their old address in Washington with telegrams.

Now firmly established as a United States resident, Coosie seems to get more lively every night. Apparently she never heard of the law of gravity, for she will launch herself into space without seeming to give a thought as to where she is going to land.

She can swarm right up a floorlamp base and she can hang by her tail from a chair arm. She travels from place to place in a series of hops that make one think of a kangaroo. She still retains her love for chewing toes. Ears, too, are among her favorites. Extensive travel has not made her blasé. She retains an active interest in everything, and she is a most appealing ex-stowaway.

WHY A NATURALIST SCULPTS

(Continued from page 24)

in wood. Each wood reacts differently to tools; to polishing techniques. Each has a different texture and grain. The most rabid wood-lovers will maintain that to paint or stain any wood, most particularly any hardwood, is a gross violation of taste. My own observation is that virtually every amateur who occasionally builds furniture, chests, or shelving, labors under an almost pathologic compulsion to paint or stain his wood, any wood. Let him sand it, wax it, then leave it alone!

Most native hardwood trees furnish acceptable wood for sculpturing. My own favorite is black walnut. Its inner core only is "black" (really dark rich brown); the outer two-thirds of this tree is a light wood, just as hard although not as alluring as the heartwood. Next choice is the rock-ribbed, sap-yielding hard maple, pride of Vermont. Its wood, not as gaudy or spectacular as many of the tropical importation, is chaste, tastefully grained, hard, dependable, strong. You are in luck if you have a woodlot or burn wood for heating, for then you will be felling every winter such splendid carving woods as beech, birch, ironwood, maple and three species of hickory. And you may be able occasionally to pull out of the woodbox a fine, well-seasoned specimen for your next sculpturing. (My family say I have developed a trick of checking each stick of firewood in midair, and studying it just before it goes into the stove—or doesn't.) From an orchard you can get occasionally a pear or apple trunk; these softer materials are good textures to work on in one's beginnings. Importers of fancy foreign woods are now bringing in from the tropics those melodramatic woods that are the aristocrats of the art exhibits. Satinwood, rosewood, mahogany, ebony, teak, prima vera, are all beautiful. Yet, be it remembered, in last analysis wood-beauty is probably only an adjunct to sculpture; it rarely can take first place from the sculpture motif itself, which must carry the conviction and the originality of the work, if it has any.

I must conclude now, and get back to work! I beg you who have any hunches that you would like to sculpt wood, to buy a half-dozen highclass wood-carver's tools and *just go at it!* It is hard work, and a lot of joy too! For all you know, perhaps somebody, sometime, is going to call your fragments art—perhaps some "critic," it may be, whose profession it is to issue passes to that fabulous realm beyond the sky.

NEW STARS RISE IN THE WORLD OF PLANTS

(Continued from page 42)

golden orange flower.

The late General George Patton is honored by having a new gaillardia named after him. The flower is a brilliant dark red with a distinct, narrow, golden tip on the end of the flower petals. Enormous in size, but beautifully proportioned, and the flowers are borne on three and one-half foot stems. It is a strong, dependable grower, but, like all gaillardias, it prefers a warm, sunny, well-drained spot in the garden. This is from Wayside Gardens, who, as usual, offer a number of interesting new novelties, including several exclusive rose introductions. The colorful Wayside catalog, in case you do not know it, is a handsome assemblage of the finest in hardy garden flowers and other plants.

The famous Dove tree, *Davidia involucrata,* is at last available in good-sized shrubs from Wayside Gardens. A native of China, this rare tree grows eventually to a height of forty to fifty feet, and the white flowers in late May resemble doves in flight. Although it is safe only to plant the Dove tree in regions of mild climate, south of Philadelphia, those who are fortunate enough to be able to grow it will possess one of the real treasures of the plant world.

A new white buddleia or Butterfly bush also sounds interesting. Being dwarf, it is suited for the low border, and it blooms profusely from late summer until October. It is also from Wayside.

As no garden is complete without fruit trees or bushes, we now glance at the offerings in this field. Since this survey does not attempt to do more than to skim some of the cream from the commercial introductions, it should not be considered in any sense scientific or exhaustive. Everyone will have his own preferences, and, also, there is the important matter of soil and climate to consider. However, here goes for a few of the better fruit introductions:

Red Gold apple is a Stark introduction. A seedling of the famed Golden Delicious, it hails from Cashmere, Washington, where it was discovered by Mr. F. A. Schell, a pioneer apple grower. This apple is intended to supply the demand for one of the Golden Delicious type but with an attractive, bright red color. It has been thoroughly tested on the Pacific Coast, as well as in the Midwest, and looks promising.

The Starks also offer "Earliest," a new "super-early eating apple, and another variety called "Jon Grimes," which ripens ahead of Johnathan and has the favorable characteristics of Grimes Golden. There is, also, a new hardy peach, Sure-Crop, which has not missed setting a crop in the Stark test orchard since it was first planted in 1939. It is hoped that this variety will extend the peach production area, at least for home orchards, two hundred miles or more northward in many sections.

Howard's Miracle is a new, patented plum being offered by Wayside. It has great size, a delicious flavor, with a nectarine-like flesh. The tree itself makes a beautiful ornamental of medium size suitable for a small garden, and the autumn foliage colors up like a maple.

And here we are, without even having attempted to appraise the choice new things in irises, dahlias, gladiolas, lilies, and other popular flower families. You will just have to do your own catalog browsing.

GAMES

TRUE SECRET of Ventriloquism. First time published. Free Booklet. Quakerbush, Big Flats, New York.

GENEALOGY

TRACE your family history with "Guidex"! Literature free. Family Guidex, P. O. Box 829-N, Annapolis, Md.

HOBBIES

EARTHWORM CULTURE. A fascinating hobby; profitable home industry. Write for valuable free bulletin-review on "Earthworms: Their Intensive Propagation and Use."—Thomas J. Barrett, Earthmaster Farms, Box D-488, Roscoe, California.

BOOK "How to Make Money with Hobbies." Included extra over 40 pages prosperity plans; successful ideas; other hobbyists. Both only $1.00. Louis Lant, 56 Teneyck Avenue, Albany, N. Y.

WHITTLING PATTERNS, 50 human figures and animals for novice and expert 25¢. Pattern Service, P. O. Box 1312, 430 Lancaster Ave., Lancaster, Penna.

LEATHERCRAFTERS! Send for catalog listing leathers, kits, supplies. Kit Kraft, Dept. A, 1607 South Western Ave., Los Angeles 6, Calif.

EARN MONEY AT HOME—Assembly colorful handmade jewelry! Free wholesale proposition. Hughes, 712 Kimball, Danville 18, Ill.

HOME STUDY

LINGUAPHONE FOR LANGUAGES. At home learn to speak Spanish, French, Russian, German or any of 29 languages by quick, easy Linguaphone Conversational Method. Linguaphone is available under GI Bill of Rights. Send for FREE book. Linguaphone Institute, 73 RCA Bldg., New York 20, N. Y.

MASTER Russian at home in 100 hours. Guaranteed course, $1.50. Eugene Lerner, 15 East 208th Street, Bronx 67, N. Y.

GROW, SELL POTTED Flowers, vegetable plants. New Plan shows how. Write: Chester Bowers, Loyalton, Penna.

INDIAN CURIOS

ARROWHEAD and lists 15¢. Good flint spear $1.00, 8 triangles $1.00, flint knife 75¢. Williams, 405 S. Monroe, Green Bay, Wis.

MAKE-IT-YOURSELF

WHITTLER'S—Supplies—blanks—special woods—knives. "Old" Whittler, 1402 Charles St., La Crosse, Wis.

MICROSCOPES

ALL ALUMINUM MICROSCOPE complete with slides, instruction manual, only $2.49 postpaid. Fleischer's Laboratories, Everett 49, Mass.

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READ THE EARTH SCIENCE DIGEST, America's foremost mineral and fossil publication. Sample copy 25¢. Address: The Earth Science Digest, Box 57, Omaha 3, Nebr.

"GENUINE" Arizona RUBIES (Garnets). Send quarter for packet. Mineral Specimens Company, Box 2651, Phoenix, Arizona.

MISCELLANEOUS

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INCORPORATORS! Tax Research Bureau, Inc., Delaware Trust Building, Wilmington, Delaware. Many advantages, low rate. Free details.

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"NYLONS" $14.00 dozen. Details 25¢. "Wholesale Catalog Directory" 10¢. Thousands of articles. Stafford Sales, Box 5211, Indianapolis 1, Ind.

YOU CAN ENTERTAIN with chalk talks. Catalog 10¢. J. G. Balda, Cartoonist, Oshkosh, Wis.

POWERFUL MENTAL TELEPATHY, Practical. Free Literature. Elgin Johnson, 912 Benton, Nashville, Tenn.

PHOTO CARDS. Assortment 25¢. List free. Defiance Lefferts Station, Box 48, Brooklyn 25, N. Y.

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MUSICAL INSTRUMENTS

PIANO Students! Self-Instruction in the chords $2.50. William Otto, 4215 Park Ave., Union City, N. J. Sample Lesson 10¢.

OZARKS

RAYBURN'S OZARK GUIDE, Eureka Springs, Arkansas. Magazine for homeseekers, tourists, folklorists, sportsmen. Year $1.00.

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MOON AND STAR: List for stamp. Forrest Sowers; Doylestown, Penna.

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PLANTS

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LOWEST PRICES! For Quality Printing. Save money! 5000 letterheads 20lb $3.95 per M. Envelopes same price. Samples FREE for Business Men and concerns who write on their letterheads. Others send 10¢ for postage and handling. FAULTLESS PRINTING Dept 9 3439 Michigan, Chicago 16, Ill.

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RAISE GIANT CHINCHILLA RABBITS. Year round income. Ideal occupation. Tremendous demand for gorgeous furs, delicious meat. Great scarcity means large profits. We buy your youngsters. Willow Farm, R25, Sellersville, Pa.

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LABORATORY Supplies. Chemicals and Apparatus all descriptions. 36 page book 10¢. Standard Science Supply Co., 1232 N. Paulina St., Chicago 22, Illinois.

SEA SHELLS

SHELLS FOR SALE. Land and Marine; Cape Cod. Special 12 for $1.00 in box; Lists on request. Mrs. F. K. Hadley, Box 33, West Newton, Mass.

SCIENTIFIC COLLECTION West Coast shells 100 species two each $15., twenty species, $2. Check list west coast shells $1. John Q. Burch, 4206 Halldale, Los Angeles 37, Calif.

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HJALMAR HVAM SAF-SKI patented precision bindings release your boot from your ski in bad spills yet they are safe and secure in downhill, slalom, cross-country and jumping. Endorsed by experts, SAF-SKI ensures safety. Northeast Ski Equipment Co., Devon, Connecticut.

LEATHER PANTS sheepskin lined, zipper front original U. S. Air Corps issue, warm, light. Satisfaction guaranteed. All sizes, $8.50. New York Clothing Co., 2079 Second Ave., New York 29, N.Y.

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TRIANGLE SET 3¢ with approvals. Mallo, 767 Leith St., Flint 5, Mich.

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1,000 GRABBAGS, 15¢ each. Special Bags 25¢. Andy, 630 Bingaman, Reading, Pennsylvania.

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Under the Microscope

By JULIAN D. CORRINGTON

THE PHOTOMICROGRAPHS FROM SLIDES COURTESY OF BAUSCH AND LOMB OPTICAL COMPANY

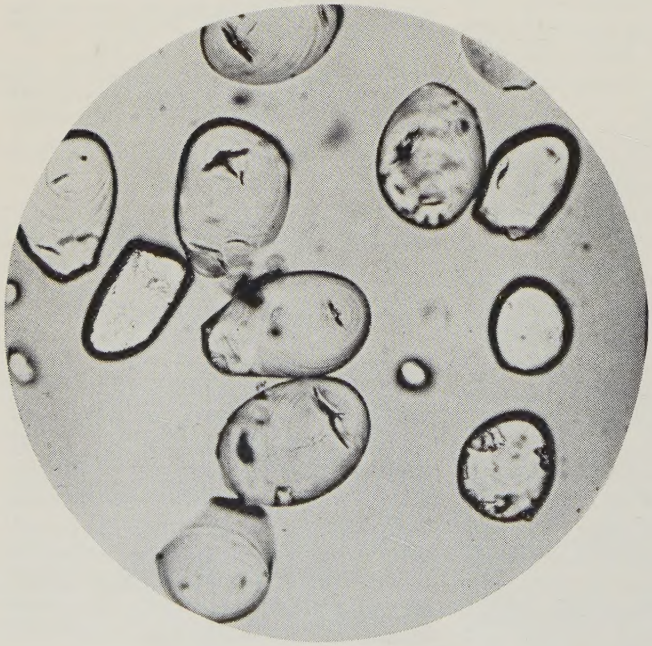
WRITE IT YOURSELF

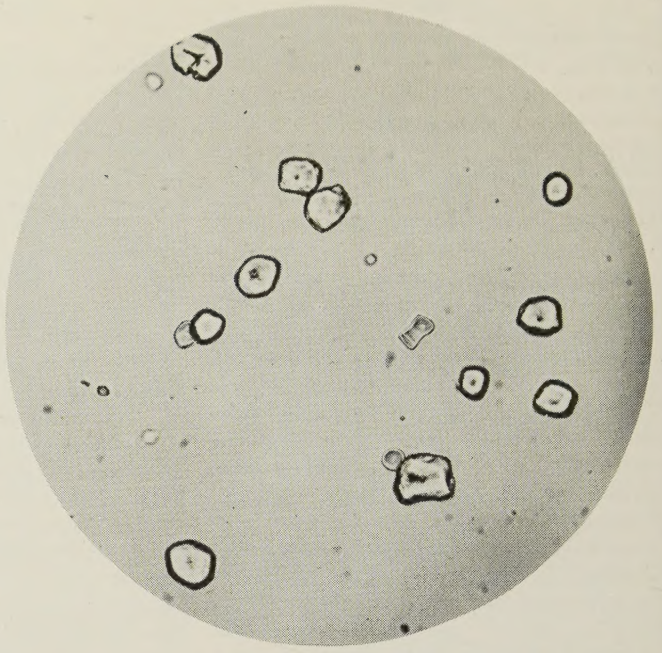
DURING the ten years of existence of this Department, we have written the articles for you, and so it is high time that the tables are turned. Now *you* are going to write one for us! The subject is STARCH GRAINS, and we will expect you to tell us all about the different kinds, how they are studied under the microscope, and why, and how slides are prepared.

There is no specified length for the article, but it must not exceed six pages of double-spaced typing, which comes to approximately 1800 words. Copy must be typewritten, double-spaced, and must be accompanied by three illustrations, either drawings or photomicrographs. If drawings are submitted, they should be done with black India ink; photomicrographs must be glossy prints for reproduction. Articles must be postmarked not later than midnight March 1, and should be mailed to Dr. Julian D. Corrington, 1306 Madrid St., Coral Gables 34, Florida. If you wish your manuscript returned, in case it does not win the prize, you must also enclose a self-addressed, stamped envelope. The winning article will be published as the feature of this Department in the June-July issue, which marks the completion of ten years of *Under the Microscope*, and becomes the property of NATURE MAGAZINE. Twenty-five dollars will be paid to the winning contestant.

As a preview, two photomicrographs of starch grains appear here, to give an idea of the appearance of these bodies, and the variation according to species. If the contestant has read a number of the feature articles in this Department, he will be familiar with the characteristics of an acceptable manuscript. Make certain that your copy is original; we cannot use copyrighted material. Avoid becoming too technical, but also avoid over-simplification. Pitch the writing to the non-professional, intelligent, adult reader, who will enjoy what you have to tell him about starch grains in terms that fit in with his interests.

Sago Starch, 500x





Corn Starch, 500x

CLEARING AGENTS

In microtechnique, the term *clearer* is given to any of numerous chemical substances used to impart transparency to a preparation. The act of applying a clearer is clearing, clarifying, or clarification. The principle is the same as that employed by our pioneer forefathers when, in the absence of glass for window panes, they used sheets of oiled paper over window openings so as to admit a certain amount of light to the cabin. Untreated brown paper was opaque, but oiling rendered it translucent.

Whole mounts of such objects as embryos and parasitic worms would be completely opaque, and the usual ten-micron sections of organs at least partially so, without the clarifying process. Strictly speaking, clearer and clearing should be limited to conform with the foregoing definitions, but the terms have an elastic meaning today, taking in territory on both sides in the series of process. Thus, in running sections up through a graded array of alcohols, the purpose is to remove water in preparation for mounting in a medium, such as balsam, that will not mix with water. This act, *dehydration*, is often completed by administering 100% or absolute alcohol, but since this reagent is sometimes difficult to obtain and sometimes inadvisable for certain techniques, the final dehydration may be performed by the clearer. For example, one reads of carbol-xylol that it "will clear from 95% alcohol."

Again, alcohol and balsam are not *miscible*—that is, will not mix—consequently some reagent must be inserted in passing from absolute alcohol to balsam, that will mix with both. The usual clearing agents all have this property, replacing the alcohol. In fact, the steps taken in technique are largely those of replacing one substance by another, so that the series has been designated as a replacement or substitution technique. Alcohol replaces water, xylol replaces alcohol, and balsam replaces xylol. Actually, then, the addition of a clearer to tissue accomplishes *dealcoholization;* such an agent as the mountant euparal (British trade name) or diaphane (American trade name for the same substance) dehydrates, dealcoholizes, clears, and mounts, all as a single operation.

In the paraffin-sectioning technique, when xylol is applied to the object just before paraffin infiltration, it accomplishes dealcoholization and clearing; but after sectioning, with the sections affixed to slides and preliminary to staining, the same reagent now acts to *deparaffin*. So we have a total of five distinct processes that may be included in the work of a clearer.

The agents themselves may be natural or synthetic, the latter having the advantage of a standardized and certain chemical makeup. A vegetable oil may have a trace more or less of a particular ingredient, so that batches from different sources or made at different times may show some variation; but ethylene glycol mono-ethyl ether, which has, fortunately for purposes of discussion, the trade name cellosolve, is made by the manufacturing chemist, has a definite chemical formula, $C_2H_5.\ CH_2.\ CH_2OH$, and is always the same.

The natural clearers of vegetable origin are termed *essential oils,* since they are the basis of essences, as in perfumes. Oils are either fixed (nonvolatile) or essential (volatile), the latter producing the aromas of woods, flowers, fruits, or seeds. The only substance from an animal source that has found use in this phase of microscopy is lanolin, a fatty material prepared from wool. Hance has tried a nondehydrating technique of passing tissues, after fixing and washing, through several changes of melted lanolin and thence into paraffin to which 2 to 5% of hard sheep fat has been added. Xylol is an example of a clearer of mineral origin, and is a hydrocarbon of the benzene series, from petroleum; it may also be prepared synthetically. Other prominent synthetic reagents are dioxan and cellosolve; they replace the entire alcohol series and greatly shorten the labor and time.

By far the most widely used of all clearers is xylol. A word about terminology may be useful here to avoid possible confusion. The ending *-ene* is favored by British, *-ol* by German chemists; thus xylene and xylol are but two different names for the same substance; so also, benzene, benzol; toluene, toluol. Some American technicians prefer the British, some the German endings, while others use both rather indiscriminately. Xylol will turn milky in the presence of even a trace of water; objects cleared with this reagent must be thoroughly dehydrated. Xylol has the property of hardening tissues, sometimes an advantage, more often a disadvantage; accordingly, a prolonged stay in this clearer is not advisable. Xylol evaporates so rapidly that care must be used to see that sections do not dry out in passing to balsam.

Because of these drawbacks, none of which are usually very serious, some workers prefer other clearers, as cedar oil, which is recommended for very delicate objects in any case. Cedar oil is slow but foolproof, since material may be left in it indefinitely without harm. Some other clearers, each of which has its adherents and purposes, are anilin, beechwood creosote, carbolic acid, carbol-xylol, castor oil, cellosolve, chloroform, methyl phane, dioxan, euparal, Eycleshymer's clearer (equal parts anhydrous carbolic acid, cedar oil, and oil of bergamot), methyl benzoate, methyl salicylate (synthetic oil of wintergreen), oil of bergamot, of cajeput, of cassia (cinnamic aldehyde), of cinnamon, of cloves, of origanum, of sandalwood, of thyme, of turpentine, terpineol, and toluol.

Microscopists, absorbed in the details of their work, which looms to them as of utmost importance, are apt to overlook the fact that these reagents were not introduced for their particular benefit. On the contrary, the essential oils are widely employed in quantities that make their microtechnical uses a mere drop in the bucket, for the manufacture of perfumes, flavorings, soaps, liquers, medicinals, and other products. Xylol is the parent of a whole series of compounds in chemical industries, while dioxan and cellosolve are prominent in plastic chemistry.

BEGINNER'S PRIMER

Flies, and more flies! The midges, belonging to the family Chironomidae, are similar to mosquitoes, but average smaller and more slender or delicate in build. The legs are long, the fore pair often raised when the insect is resting, whence the name of the family, which means "one who gestures with his hands." The mouthparts form a short proboscis, but are not designed for piercing, and these flies are not blood-suckers. The antennae of many specimens, such as the best-known genus *Chironomus,* are exceedingly plumose and make a fascinating whole mount. The larva of this genus is bright red and termed a blood worm; it, too, makes an excellent whole mount.

One of the easiest ways to tell midges from mosquitoes is that they lack the fringe of scales on the wings so characteristic of the latter group. They swarm and dance in the air, notably in the late afternoon, often in enormous numbers, sometimes making a humming noise.

In the related family, Ceratopogonidae, we meet with midges of a different stripe, known far and wide for their proclivities as vicious biters and blood-suckers and, in various regions, as sand fly, punkie, or no-see-um. The last is a highly descriptive Indian name, these flies being often so small that they will pass through ordinary screens and plague the entire household. *Culicoides* is the best-known genus, the name meaning mosquito-like. Visitors to the seashore all too frequently make the acquaintance of this pest, which also annoys the Adirondack camper.

Both of these families contain salt-water species, an unusual habitat for insects.

The family Cecidomyidae, or gall gnats, includes the smallest of all midge-like flies, some of which are fearfully injurious to crops. Here belongs the notorious Hessian Fly, *Phytophaga destructor,* held by some to have been introduced into America by Hessian soldiers in the Revolutionary War. With two to three

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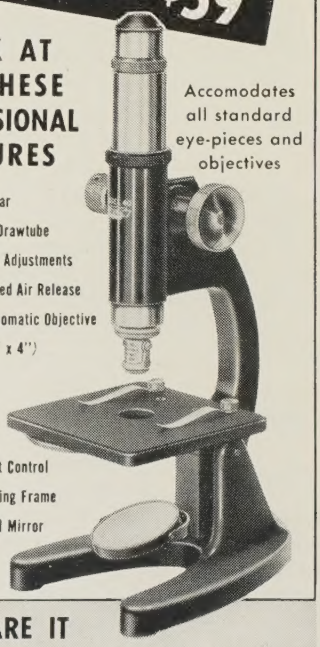

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generations per year of tiny larvae that live at the base of leaf stalks of the wheat plant and suck its juices, the result is weakened plants that produce few seed and break off in the wind. The larvae pupate inside the last larval skin, exemplifying a type termed a *puparium*. The resemblance to a flaxseed is so striking that these pupae are called by that name. In this form they winter over, adults emerging in the spring. The wheat midge, *Thecodiplosis mosellana*, is another species in this family that also attacks wheat, infesting the flowers, pollen, and seed.

Some gall gnats, as *Miastor americana*, exhibit a remarkable phenomenon in reproduction, known to advanced students of biology as *pædogenesis*. This is defined as reproduction of young by a larval form, a rare occurrence. In *Miastor* females, a few large eggs develop into large larvae, which proceed in most ungrateful fashion to eat up their mother, and then give birth to a number of daughter larvae. Several generations of these pædogenetic larvae may be produced, with certain ones pupating from time to time to develop into the winged adults.

Still other members of this family are predacious on aphids and small insects generally, while others feed on decaying matter. Cecidomyids have long moniliform antennae, broad wings, and prominent halteres. Many of the larvae exhibit a peculiar breastplate or breast-bone or spatula, as it is variously called, of heavy black chitin, on the under side of the thorax.

All of the families considered this month are splendid for whole mounts of all stages in the life cycle. Being very small and delicate, the specimens must be handled and processed with extra care, but the patience needed is well rewarded. The amazingly intricate structure of animals so small as these gives much food for thought, and can be appreciated only under the microscope.

TRADE NOTES

Pestilence Seldom do we find the layman bold enough to venture into the formidable field of writing on medical subjects. Occasionally, however, such an author girds himself with facts, consults with professional colleagues and friends, and tackles some aspect of medicine from the standpoint of the layman. If, in addition, the writer has literary merit, we may get a much more readable and interesting discussion than from some from the pens of physicians themselves.

One of the best of this class of writing we have seen is *Plague On Us*, by Geddes Smith, the tale of the great pestilences that have ravaged mankind for twenty centuries. The author is a staff member of The Commonwealth Fund, a forty-eight million dollar concern, started in 1918, for the promotion and maintenance of public health through medical research and education, public health and hospital services in rural districts, and mental health services. Mr. Smith is a joint author of two books on child guidance.

The present work should go far in assisting the Fund in its worthy aims, for it certainly tells as fascinating a story as any fictional adventure or detective mystery. Not that it is written sensationally—it does not have to be—scarcely any event in human experience is more sensational in itself than a devastating epidemic or world pandemic. Here is the graphic and historical account, beautifully written, of the great epidemics of recorded history, very carefully documented. The gross ignorance and superstition of the past, the long and arduous detective work in tracking down the culprit in each case, as scientific knowledge dawned, the triumph of modern cures and prevention, with progress to date in our constant warfare against those unseen enemies, the protozoa, bacteria, viruses, and other pathogens. Each chapter is an exciting experience in man's contact with and attitude toward contagion. Intended for the bookshelves of all intelligent and thinking people, who desire accurate, non-technical information on one of the world's major problems. Pp. viii, 365; plts. 11, 1 in color; 10 graphs, 4 maps. The Commonwealth Fund, 41 E. 57th St., N. Y., 1943. $3.00.

Microscopy The best popular account of the electron microscope thus far to appear is, in our opinion, *Seeing the Invisible*, by Gessner G. Hawley. In an interesting and non-technical manner, the author explains why the light microscope can reach down only so far into the world unseen, and how it is that the electron instrument can go much farther. Construction and operation are discussed, together with an excellent and personalized history of development of this great tool. We were especially impressed by the chapter on limitations of the electron microscope. Most writers on the subject have been too much carried away by their enthusiasms or have otherwise suppressed or soft-pedaled doings that the new microscope cannot do or does less efficiently than its older cousin, as well as disappointments in performance to date. Mr. Hawley is no less enthusiastic, but is fairer and less biased.

Of greatest interest to the general reader will be the three chapters on the electron microscope as a research appliance and just what it has accomplished to the present, as well as a survey on what it may reasonably be expected to achieve in the future. Unquestionably, many important discoveries lie just around the corner. The illustrations are abundant and well selected to exemplify the various explanations of the text. Written for the layman who wishes to keep abreast of modern scientific developments, this book will earn its place in the library of every serious user of optical equipment. Pp. xv, 196; figs., frontisp., 71. Alfred A. Knopf, Inc., 501 Madison Ave., New York, 1945. $2.50.

Anton Van Leeuwenhoek

By CARSTEN AHRENS

I guess you were the poorest janitor
The old town hall in Delpha had ever seen.
You fashioned curious lenses all day long,
And hoped your wife would keep the building clean.

Those good Dutch burghers surely scorned you, though;
They said things (had you listened) would have hurt.
They couldn't comprehend the one-celled things
Your lenses pointed out in common dirt!

You found uncommonness in commonplace;
You peered and studied, tried to understand.
We call you "Father of the Microscope",
O Gulliver in Protozoa Land.